THE PRÆFACE OF THE Author, setting out the dignitie, and Ample vse of Cosmographie.

IF EVER THERE wer Art for all mẽs vse inuented, Science set forth wherein consisteth Sapience, or Treasure worthy to be had in estimation: no doughte (louynge Reader) either Cosmographie is the same, or els it is not to be founde vppon th'Earth. For if we do well consider with oure selues what her office is, there is no man I suppose, so meane witted, but will confesse her ample vse, nor yet so simply learned but must acknowledge her manifold benefites. And if I shall begin with the defence of our Coũtry, which ought to be more prætious, thẽ Parentes wife Children or Consanguinitie, Cosmographie herein do so much profite, that without it both valeaunt Corage, Policy and Puissaunce oftentimes can take no place. For by her we are taught whiche way to conduct most safely our ooste, where to pitch oure tentes, where to winter: yea, and where most aptlye to encounter with them in the fielde. VVhich thing Alexander the mighty Conqueroure vnderstanding, accustomed to haue the Mappe and Carte of the Country, by his Cosmographers set out, with which he would warre. Commaunding it also to be hanged in open markets for all men to behold, wherby the Capitaines did forsee, and seke out where was the easiest places to arriue, and the Souldiors allured with the commodities of the Countries, were made the willinger to the thinge. This was it which gat him so many victories, and made him so great à Cõqueror. This was it which obteined the Romanes their fame, more then ther force and strength. This hathe bene to all men profitable, and iniurious to no man. On the contrarye parte, what domage, yea vtter subuertion hathe followed to moste noble Princes, and valeaunte Capitaines throughe Ignorance of this Art, histories full well can testify.

And that amonge manye, I maye reſight one Example, was not the mightye pertian King Cyrus (who had brought Babilon, and all the Eaſt partes in ſubiection) vanquiſhed withall his armye of Tomyris the Scythiã Quene, at the Riuer Oäxis, as he ſhuld haue paſſed ouer? what ſhall I ſpeake of Agamemnons armye in the Troian warres: of the Perſians, againſt the Leonidians: or of Craſſus, againſt the Partheans: whiche ware them ſelues deſtroyed, or made captiue, theyr wiues children and family ſpoyled, and theyr country moſt ruinouſly ſubuerted, for want of Coſmographie. Alſo, as touching the ſtudy of diuinitie, it is ſo requiſite, and neadfull, that you ſhall not vnderſtãd any boke, ether of th' old law or Prophets (yea I had almoſt ſaid, any part of à booke, or Chapter of the ſame) being in this Art ignoraunt. For what numbre of places, Ilands, Regions, Cities, Townes, Mountains, Seas, Riuers, and ſuch like, is ther to be found in euery Booke? How often doth father Moſes in his .v. bookes, make mention of Babilon, Sinehar, Armenia (in whoſe hilles, Noë his Arke ſtayed after the vniuerſal deludge) Aſſur, Charan, Caphdorim or Caldæa, Ægipt called of the Hebrues Mizraim, Syria (deuided into thre parts, Meſopotamia, Arabia, and Æthiopia,) with infinite like places, whiche without Coſmographie can nether be rightly vnderſtand, or yet truly expounded? VVhat contention, and ſtrife, haue ther ſpronge in all ages amonge th' Interpreters of the ſcriptures, touching the ſituatiõ of Paradice: their owne workes moſte euidentlye beare witneſſe. All they agree in this poynt, that it is à place of ioy, reaſt, and abounding in all kinde of pleaſures, but yet as touchinge the ſituation, ſome vnderſtand it ſpiritually: ſome imagin it ether in heauen or in the harts of the quiet and faithfull: other affirme it à place in th' Earth at this præſent yet remaining, but is ſo kepte with Angels that no man maye come to it: ſome ſay it is in th' Eaſt part of the worlde, aboue the middle reagion of th' Aëre, and ſo is free from the violence of all windes. Other ſuppoſe it to be in the burning Zone, vnder th' Equinoctiall: So that not two in this poynt do accord. But yet of all the reſt, ther opinions ſemeth moſt fond, whiche place it in the middle region of the Aëre, and alſo thoſe, that vnderſtand it ſpiritually, for that the ſcripture affirmeth it to be in th' Earth, and the .iiij. famous floudes (Euphrates, Hidekel nowe called Tigris, Gihon, which many interprete Nilus, and Phiſon at this daye named Ganges (to come from thence.

Theſe

These thinges I bring in only as example, to proue the necessarye vse of it in deuinitie, and not to dispute ether of Paradise or his situatiō, seing it belongeth not to my profession, and office. Moreouer mannes helth (withoute whiche Honour, Fame, Richesse, Frendes, and Life it selfe, semeth bothe troublous, and noysome) can not be conserued in perfite estate, or once lost be recouered and restored without Cosmographie. For howe greatlye herein it profiteth, to consider the temperature of Regions, Cities, and Townes, in what Zone, & vnder what Clymate and Parallele they are situated: Hippocrates dothe plainlye set out. Yea it might seme superfluous, to show how bothe he & Galenus, commaunded ther pacients to remoue from one place, to an other (especiallye in longe sickenesse) because of th' alteration of th' Aëre. VVhat it auaileth also, to know the natures of waters, the quality & pertition of windes, the maners & complexions of th' inhabitantes all Physicions right well do vnderstand. And to cōclude, in th' election of simples, as stones, treis, rotes, herbes, gummes, earthes, metals, beasts, foules, & fishes, what lighte springeth by consideringe the countrye from whence they are brought: I suppose no man of that profession, is ignorant. In the making, & ordaining lawes, for brideling mans froward appetide, Cosmographie is not vnfrutfull. For she setteth out the natures of all people, the lawes and statutes by which they are gouerned, & the sequele of euery decre established. Grammarians also, can not fullye vnderstande the pleasaunt inuention & perfite sence of the witty Poëtes, but by Cosmographies aide, because of the names of Regions, Cities, Townes, waters, fluddes, mountaines, ceremonies, people and monsters, which euery Poet do commenlye introduce, in all theyr writinges. I omit for breuitie, th' incredible benefits, whiche springe by reading of Histories: the beautye, & ornature of which, consisteth in the description of countreis, names of people, & nature of th' inhabitants: whiche remaine as vnknowne of th' inexperte of Cosmographie. Moreouer, the famous marchaunts, haue by it not onlye inriched them selues, but also their country: fineding out suche commodities, as without it shuld remaine, as not knowne. Yea & that is daily more & more perceiued, for what countrie, or Iland, is not in oure age searched out? what shall I herein speake of Vesputius Americus, who (by his knowledge in Cosmographie) found out America, the. iiij. parte of the world, (vnknowne in all ages before our time) to the great bene-

fites

fites of all Europe. I may seme to vtter that all men know, in making reherſall of th' Indians, Calicute, Ginea, the .v. Ilandes Moluccæ, alſo Porne, Sololi, & infinite other, which are the frutes of Coſmographie in this our age. Mariners & trauailers on the ſeas (without which no realme can long ſtand, or mans life be ſuſtaind) are bound to acknowledge Coſmographies benefites. For it ſetteth forthe there portes, it ſheweth ther courſe, it declareth th' ordre of windes, it warneth them of rockes, ſhaloues, ſandes, & infinite like dangers. In trauailing by land, her tables poynteth which way to folow, that thy iornay may be ſpedier, ſafe, ſhort, & pleſant, wher you ſhall aſcend vp to hilles, wher to paſſe ouer waters, where to walke through woodes, and wher moſt aptly to remaine at night. If al theſe were not (as it ſerueth to infinite vſes more then time will permit to repete,) yet this one were ſufficiēt to kepe it in honor, that by it, in ſo ſmall à lumpe, or piece of clay, beholding ſuch ſtrange formes of men, beaſtes, foules, aud fiſhes ſuch diuerſitie of times, ſuch burning hilles, ſuch merueilous ſtones, metalles & plants, we are inforced to confeſſe th' omnipotency, and wonderous worke of God. This is it, that prouoked Dioſcorides to leaue cities, & townes, & trauail into deſerts, & wods, to ſerch the nature of herbes This cauſed Atlas, Ptolomæus, & Alfonce, to be ſo diligēt in ſetting out the heauens courſe, & forme of this earthly manſion. The vtilitye of this, alured Orpheus, Solon, Democritus, Pythagoras, Eudoxus, Plato, Hipparchus, Polybius, Strabo, & an hundreth more of the auncient Philoſophers, to leaue their country, frends & acquaintāce, not doubting perel of the ſeas, dāgers of enemies, loſſe of ſubſtāce, werines of body: or anguiſh of mind. Yea the ſweatnes therof was ſo great that Strabo after his trauails ſaid, that if any arte were requiſite for à Philoſopher: it was Coſmographie. And Homer called Vliſſes the wiſeſt among the Græcians, becauſe he knew the natures of people, and the diuerſitie of nations: Adding, that his eloquence, prudence, fortitude, conſtancye, & other like vertues (mete for à man) inſued of hys perigrinations, & trauails, which remaining at home, he ſhuld neuer haue learned by any preceptes, diſcipline, or teacher. But ſeing diuers in oure age are deſirous of knowledge no leſſe then the Philoſophers were, & yet can not trauaile for the diſcorde of nations, the ſondrye ſectes of people, and diuers other impedimentes, our refuge is, to ſaye with Propertius,

Cogor

Cogor et è Tabula, pictos edíscere Mundos.
In Tables set out, Countries to decerne
Constrained am I, and eke for to learne.

In which, I had almoste (through making ouer much haste) forgotten to resight the benefits we receiue of Cosmographie: in that she deliuereth vs from greate and continuall trauailes. For in à pleasaunte house, or warme study, she sheweth vs the hole face of all th' Earthe, withal the corners of the same. And from this perigrination, thy wife with sheadinge salte teares, thy children with lamentations, nor thy frendes with wordes shal dehort & perswade the. In trauailing, thou shalt not be molested with the inclemencye of th' Aere, boysterous windes, stormy shoures, haile, Ise, & snow. Comming to thy lodginge, thou shalt not haue à churlish & vnknowne hoste, which shall minister meate twise sodden, stinking fish, or watered wine. Going to rest, thou shalt not feare lowsy beddes, or filthy sheates. In Somer, the sone with his fierye beames, shall not vexe thee: nor yet in winter, stormye Saturnus shal make thy beard frosen. In sayling, thou shalt not dread Pirates, feare Peries and greate windes, or haue à sicke stomacke through vnholsome smelles. Therfore these things considered, who is not incoraged to acheue suche an interprice, as shall redounde to his countries fame, & his perpetuall memorye? what wise man dothe not delite to reade such thinges, as Emperoures, Kinges & Princes haue painfully trauailed in, esteming ther labours plentuously rewarded, with the frute of this Art? But least these my wordes, should stirre vp the greadye appetides of diuers to this knowledge, & then to wante herein that mighte satiffie the same, beholde I haue compiled this my Cosmographical glasse. By which, such as are delighted in trauailing as well by land, as water, shal receiue no small comfort (If I be not deceiued) & th' other sort, by it may also protract, & set out perticuler cardes for anye countrye, Region, or prouince: or els th' vniuersall face of th' earth in à generall Mappe. Firste if they describe Parallele circles in the Mappe, answeringe to the like circles in the heauens: & by the right or croked Horizont, th' equinoctiall, polary circles, and altitude of the pole, to limite out the Zones, Climates, & Paralleles of Longitude, and Latitude: which being once præpared, you shall place there in the countries, hilles, fluddes, seas, fortresses, Ilandes, cities, desertes, & such like (according to the præcepts of th' art) as are placed on the platte forme of th' earthe. And that the præceptes myghte

seme

seme the more facile & plaine, I haue reduced it into the forme of à Dialoge: the names of the personages in dede fained, but yet most aptly seruing our institutiõ. In which Spoudæus (repræsenting the Scholer) maketh doubtes, asketh Questions, obiecteth: yea, & some tyme, digresseth not from the fonde imaginations of the grosse witted. Vnto which, Philonicus (suppliyng th' office of à teacher) answereth to to all th' obiections, & giueth præceptes. VVhat diligẽce I haue giuen in time of the Printing, to the correction herof, and also in diuisinge sundry newe Tables, Pictures, demonstrations, & præceptes: that you may easely iudge by readyng the same worke. Also what charges the Printer hath susteined, that his good will might not be wanting, that shalbe euident conferryng his beautiful Pictures & letters, with suche workes, as herto hath bene published. And thus I leaue the with my Cosmographicall Glasse, requiryng that these my trauayles & labours, be not rewarded with ingratitude, or ill reporte. And if for the difficultie of the worke, any errour escape: remember I am the firste that euer in oure tongue haue written of this argument, & therfore am constrained, to finde out the pathe. Whiche if it be not at this time made plaine, smothe & pleasaunt: if God graũt life, & leisure, I trust so to treade it againe, that both night and day (walking in the same) thou shalt not misse of the desired Port. Againe fare well, & fauoure me, as I wishe thy furderaunce in knowledge. At Norwich, the xviij. of Iuly. 1559.

THE FIRST BOOKE OF THE

Cosmographicall Glasse, conteinyng the necessary Principles required in this Art: and therfore is an Isagoge, or Introduction vnto the hole worke.

The Interloquutors:

Philonicus. Spoudæus.

Spoudæus.

ATELY CAL-lyng to my remembraunce the Race that euery mã in this his trãsitory life haue to runne: and that faultes committed in this course, for want of time, can scarslye with great difficultie, labour, and diligence, any thing be amended: I was of force compelled, to confesse those most happy, whiche vse this time (being so great a treasure) as repentaunce maye take no place. And on the other part, those most miserable mẽ (yea, rather Images, and pictures of men, then very men in dede) whiche imploy their busy cure & care, in stealing, Idlenes, vayn pastimes, long sleapes, dronkennes, lasciuious toying, swering, scraping and gatheryng of Plutos corne together, as though they had more time, then myght be well spent in the exaltyng of Vertue, supplãting of Vyce, and profiting their Countrie, Frindes, and Consanguinitie. In time past, folowing only nature as Ruler and guide, men did more earnestly, (and as it weare with an insatiate mynde) seke Vertu for hir selfe, and abhorre Vise, for

Men happiest

Time the greatest treasure.

Men most infortunate.

the horrible name therof: thẽ we do in our daies, hauing both Nature, Gods preceptes, and politiquè lawes, as our Capitaines and lodesmen. VVhiche abuse of time, is the greateste cause, that men in our age, are not comparable in any thyng to those of times past. For how many sondry Artes, secrete Sciences, and wonderfull Ingens, throwgh well spending of tyme, did the auncient Philosophers in their dayes inuente? Archimedes deuisyd glasses, with whiche the Siracusians might burne their enemies farre distant, on the seas from them. Ptolomæus, Atlas, and Alphonsus (being kinges) founde out the maruelous course and sondry motions, of the superceleſtiall bodies: writyng sondry volumes of them, to the great comfort of such, as ar lyuing at this presente. Appollo, first founde Physicke the repayrer of health. And in lyke maner, some one thing, and some an other, of whose Godly trauelles so many precious monumentes yet remayne: yea and the Authors them selues (being dead so many hundred yeares sence) are as freshe in the minde of mã, as it were but yesterday, such is the reward of vertuouse trauell. But whome do I se walking in yonder grene place, among the pleasaunt byrdes, flowers, and trees, is it not Philonicus? It is he: I will go and salute him. God the giuer of all sapience and science, saue you (ryght reuerent Philonicus.) I accompte my selfe happy, that I haue founde you: for now my hope is, to be deliuered (although not of all yet) of some of the bondes, and chaynes, of Ignoraunce.

Why men in our age, ar not so learned as thei wer in old tyme.

The frute sprīging of well spent tyme.

Philonicus. You are vnfaynedly welcome to me at this

this present: and lyke as your name is Spoudæus: so you do in no point degenerate frō the same: but are diligēt in seking knowledge, eschewing idlenes, and vain pastimes. *What Spoudæus signifieth*

Spoudæus. *That I learned, taking at you example: for you euer keping perpetual warre with ignoraūce, and vise of euery kinde: (for rewarde wherof vertu also gaue you that name) do vse to reade, and reuolue the trē sure of Sapiēce, I meane, the secrete workes of Nature shut vp, or rather conteyned, in the worthy and auncient writers. And in reading certaine of them, I haue found not only matters of great difficultie: but also (as to me it semeth) of muche vntruthe.* *The interpretation of Philonicus.*

Philonicus. *You must iudge well of their laboures whiche haue before our dayes written: for time bryngeth thinges to their perfection. If we without any grounde, should by our vigilancie, fynde out suche misteries, yea and (as I may terme them) hid secretes of Nature: I assure you, we should haue left many more errours to our posteritie, then they haue in their writynges vnto vs. Yea and there are many thinges whiche seme false and vntrue: bycause the grosse capacities, of vnlearned persons, can not redely comprehende the same. But wherof doe those Authours intreate, in whiche you haue so latelye traueled?* *The olde wryters excused.*

Spoudæus. *They be wryters of Cosmographie, Geographie, Hydrographie, or Nauigation. But because that ether they obserue no order, or Methode in their teaching, ether that they digresse from that they take in hande (and fyll their volumes with other sciēces,*

rather then Cosmographie.) I haue very lyttle profyted by my trauell.

Philo. I reioyce that your fortune was to take in hande suche authors. For Cosmographie in my iudgement is mete for euery estate, and moste excellent of all other naturall science. Wherfore be you nothing discomfortid, and amasyd with the difficultie of their wryting. For howe muche the thinge transcende in worthynes other knowledge not so plausible: so muche the more it is companion with dificultie. And where as you alleadge, that the most part of them obserue no Methode, and order: in that I will doe my indeuour, (as also in the other, where place shall require) to suplie that wante in that behalfe.

Spoud. You shall meruailously incourage me, and take away the greatest trouble in this my study, if you do not only showe me the knowledge therof in suche order, as I may best conceiue it: but also explicate, and opē such placis, as are obscure and darke for me to vnderstande.

Philo. Yet before we take in hande this studie, there is one thing, of whiche I must haue knowledge (that is) whether you haue redde any authours of Arithmetick, and Geometry: els you had best reade some of them, and resorte to me againe at some other conuenient season.

Arithmetick and Geometry necessary for this art.

Spoud. Yes sir I haue redde the ground of Artes, The wheestone of wytte, and the path way.

Philonicus. That I am glad to vnderstande: so shal it be the easier for me to instructe you, and you better to conceyue, and also retayne the surer, suche thinges as

shalbe

ſhalbe taught. For he that wyll couer the roufe of his houſe, before he haue made the foundation, and buildyd the walles: beſyde the loſſe of his coſt, ſhall be thought ſcarſe a wytty builder. But I wil exhort you as time ſhal ſeme mete alſo to reade with great diligence Orontius Arithmeticke, Scheubelius Algeber, Euclides Elemẽtaries, and Theodoſius of ſpherike Demonſtrations: not only for this ſtudies ſake whiche you now haue in hande: but for all other artes (whiche taſte of the Mathematicalles) that you ſhall here after trauell in. But nowe to the ſcope that you deſire. And becauſe that you maye knowe, wherof the matter depende of whiche we ſhall intreate, let me here what you call Coſmographie.

Orontius.
Scheubelius.
Euclide.
Theodoſius.

Spoud. *That ſemeth vnto me to be none other thing, then the arte whiche doe ſet forth, and deſcribe the vniuerſall worlde.*

What Coſmographie is.

Philo. *You haue ſayd rightly, for ſo the Etymologie of this word Coſmographie doth ſound. But is there no difference betwixt this worde Coſmographie, and Geographie?* Spoud. *It ſhould ſo ſeme to me, for both do deſcribe the worlde.*

Philo. *Then define you Geographie, after ſuche authours myndes as you haue redde.*

Spoud. *That wyll I doe gladly. Ptolomæus in his geographie defineth it in this ſorte.*

Lib. 1. cap. 1.

Η γεωγραφία, μίμησίς ἐστι διαγραφῆς τοῦ κατειλημμένου τῆς γῆς μέρους ὅλου, μετὰ τῶν ὡς ἐπὶπαν αὐτοῦ συνημμένων.

What Geographie is.

Whiche ſentence I turning into Latyne ſoundith in this ſorte.

Geographia eſt vniuerſarum terræ partium cognitarũ, vnà cum his, quæ ei veluti vniuerſaliter coniuncta ſunt, picturæ imitatio.

Whiche in our tongue is as muche to saye as.

Geographie is the imitation, and discriptiō of the face, and picture of th'earth, with her partes knowen, and of such things as are to it cōnected and ioyned.

Philo. *You haue truly repetyd Ptolomæus wordes. Now I wyll proue by your difinition, that you haue erred two wayes, in putting no diference betwixt Cosmographie, and Geographie. First Cosmographie teacheth the discriptiō of the vniuersal world, and not of th'earth only: and Geographie of th'earth, and of none other part.*

The diference of Cosmographie and Geographie.

Spoud. *Why syr, make you a diference betwixt the worlde, and th'earth?*

Philo. *Yea verely, and that as much as betwixt a mā, and his litle finger, but of that, you shal heare more or we departe. The seconde way you erryd in the order of diuiding th'earth: for albeit Cosmographie describeth the face of th'earth, yet it is by noting and obseruing certaine diuisions, answering vnto .v. principal paralleles or equidistant circles in the heauens. As they dwell in the mides of th'earth that inhabit vnder th'equinoctiall lyne, and the like of the dwellers vnder th'other circles, is said On th'other parte, Geographie doe deliniat, and set out the vniuersal earth, no respect had vnto the fornāed circles of the heauēs: but by Hylles, Moūtayns, Seas, fludes, and such other notable thinges, as are in it cōteined.*

Spoud. *Then by your wordes I also gather, there is some diference betwyxt these two, and Chorographie.*

Philo. *Yea and that Ptolomæus in the place of you alleadgid, do playnly expresse. For lyke as Cosmographie describeth the worlde, Geographie th'earth: in lyke sorte*

What Chorographie is and howe it difereth from the other two.

Corogra-

Chorographie, sheweth the partes of th'earth, diuided in themselues. And seuerally describeth, the portes, Riuers Hauens, Fluddes, Hilles, Moũtaynes, Cities, Villages, Buildinges, Fortresses, Walles, yea and euery particuler thing, in that parte conteined. And is in respect saith he, of Cosmographie and Geographie, as if a paiter should set forth the eye, or eare of a man, and not the whole body, so that Chorographie consisteth rather in describyng the qualitie and figure, then the bignes, and quantitie of any thinge.

Spoud. *Although by your wordes, I haue receiued more commoditie at this present, then by all my readyng touching the true diference of these three names: yet if it may please you to geue me the figures of euery of them, I shall so stedfastly printe it in my mynde, as I truste not to forget them, for it is truly said, thinges sene haue longer impresion then only harde.*

Thinges seene are lenger in mynde, then only harde.

Philo. *I wyll gladly fulfill your request. Marke nowe this example folowing. Here first you do see the heauens conteine in them th'earth. Whiche earth is deuided into fiue principall partes, accordinge to the fiue Circles in the heauens: the names of whiche for breuitie I omytte vntyll conuenient place, lest thorowe oftẽ repeting things thei at length seme tedious. The other*

¶ This figure repræsent the forme of Cosmographie.

other fygure without circles, repreſenteth th'earth, ſet forth with Waters, Hylles, Mountaynes, and ſuch like.

This Picture aunſwereth vnto Geographie.

And finally for Chorographie, I haue placed th'excellẽt Citie of Norwyche, as the forme of it is, at this preſent 1558. Nowe that you haue learned their difference, declare in which of thẽ you moſt delight to be inſtructed.

Spoud. *I thanke you ſyr, I ſhall neuer be able (more then with praier) to recompence your paynes. But ſence Coſmographie is more excellent then the other two, both for the manifolde vſe, and that it cõteineth and comprehendeth the other in it ſelfe: I would imploye my whole induſtrie herein.*

Coſmographie excelleth Geographie and Chorographie.

Philo. *Then ſeing that Coſmographie deſcribeth the worlde as you haue ſayde, (and that rightly) it is neceſſary to know what the world is, what the partes of it are, and how many, yea and finally, by what meanes, as well the world, as alſo the partes of it, ar deſcribed. This perfitly lernyd, haue you then for this preſent, your whole deſire?*

The argumẽt of the whole worke.

Spoud. *Yes verely.*

Philo.

Philonicus. *Then let vs beginne with the definition of the worlde, whiche the auncient Cleomedes definith in this maner.* *Lib. primo in initio.*

Κόσμος ἐστὶ σύστημα ἐξ οὐρανοῦ καὶ γῆς, καὶ τῶν ἐν τούτῳ φύσεων. οὗτος δὲ πάντα μὲν τὰ σώματα ἐμπεριέχει, οὐδενὸς ἁπλῶς ἐκ τοσαυτοῦ ὑπέρχοντος. *What the Worlde is.*

And I do translate it into Latine as foloweth.

Mundus est ex cælo, terraq; ,ac naturis deniq; in eis compræhensis, compages. Is autem corpora in se singula continet, nec extra eum, prorsus quicquam cernitur.

That is, the world is an apte frame, made of heauen, and earth, & of thinges in them conteyned. This comprehēdeth all thinges in it self, nether is there any thing without the lymites of it visible.

Whiche definition differith not from Aristotle and other famous writers. So that what so euer is betwixt the seate of the almighty gouernour of all lyuing creatures, and the center of the earth: is called the worlde. And is compared to a round ball and globe. *Aristotle.*

Spoudæus. *Then all that we ether by syght may decerne, or by arte conceiue, that same is the worlde. And conteyneth in it what so euer the eternall Creater, by his wounderfull worke haue in this circuit blessed, and made.* Philonicus. *True it is.*

Spoud. *Then I perceiue my error before cōmitted, wheare I applied this worde worlde, only to the earth.* *The Worlde and the earth not one thing.*

Philonicus. *So in lyke sorte it is otherwayes abused, but note you diligently that is saide before of Cleomedes and it shalbe sufficient.*

Spoudæus. *And is there nothinge beyonde this worlde? my imagination, leadeth me to the contrary.*

Philonicus. *In dede Pythagoras folowing imagination, more then Reason affirmeth sumwhat to bee, whiche is not comprehendid with in the worlde: and na-* *Pythagoras error.*

meth

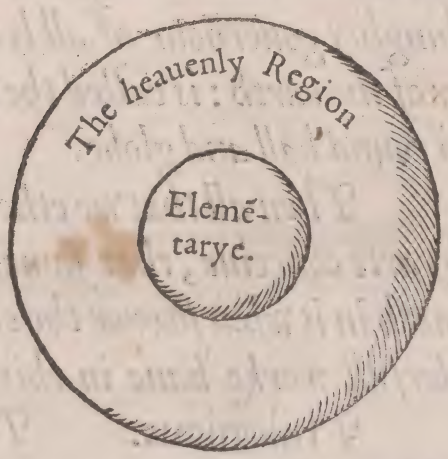
Plato. Aristotle.

meth it Vacuum. But Plato, and Aristotle, doe ouerthrowe this assertion. And seing that it transsendith the knowledge of mã let it passe, & retorne we to our matter.

Spoudæus. *What be the partes of the worlde?*

Philonicus. *The worlde is made of two partes, that is to saye, of the Elementary Region, conteinyng in it the foure Elementes, Fyre, Ayre, Water, and Earth: and what so euer of them is compounded and made, of whiche hereafter we shall intreate: and of the heauenlye region, of which at this present time we wil make mẽtion.*

The Worlde made of two partes.



This Type do represent the world, deuidid in to his two peculiar parts.

The number of the heauens.

This region do in it contayne. x. spheres, in suche sorte as the greater comprehendith in him the lesser, as the. x. heauen or Primum mobile, comprehendith the. ix. heauen callid also Cristalline. This heauen compasseth the viij. heauen, called in greke ἀπλανὴς *because the sterres kepe one vniforme distance in mouing, and for that cause are namid fixid. And so this receiue in this compasse the sphere of Saturne, Jupiter, Mars, the Sonne, Venus, Mercu-*

Mercurius, the Mone, and the foure Elementes.

Spoud. Why ſhould not the ſpheres of the Sonne, and Mone be aboue the other Planetes, as wel as in that order, you haue reherſed them?

An obiection

Philo. This ſerueth not for our purpoſe, but it is excellently proued of Ptolomæus, Alphraganus, Tebitius, Archimedes, and other, with ſuche inuinſible reaſons as can not be denied. But me thinke the pleaſaunt Poet Ouidius, maketh a good reaſon to proue the Sonne to haue his ſphere, in lyke order as is aforeſayde, whan as he ſpeaketh vnder the parſon of Phebus, vnto yonge Phaëton (entring into his Chariot) in this maner.

Ptolomæus. Alphraganus Tebitius. Archimedes.

Lib. 2. Metamorphoſ.

Altius egreſſus, cæleſtia ſigna cremabis:
Inferius terras: medio tutiſſimus ibis.

In our engliſh tunge, the meaning of theſe verſis is thus.

Directe thy Chariot in a meane, clymbe thou not to hye:
Leſt thou doſt burne the heauẽly Signes, ſet in the ſterry ſkye.
Or deſcending to lowe th'earth, of heat ſhall fele the flame.
But kepe the meane, ÿ ſhalt be fre, frõ feare, & eke frõ blame

Spoud. The cauſe is ſo manifeſt, that it nede no lenger declaration. So that I ſuppoſe theis excellẽt wryters aforeſaid, haue found out the true order of the ſpheres as you haue repeted them. And that Crates with his company, haue no leſſe erred, placing the luminaries aboue the eyght heauen: then Albetragnius whiche ſuppoſeth Venus: and Democritus, whiche affirmeth Mercurye, to be higher then the Sonne.

The error of Crates Albetragnius Democritus and Plato.

Philo. Yea and Plato, (whiche otherwyſe is a graue Philoſopher) did no leſſe erre then the other, imagining the luminaries to haue their courſe vnder all the other Planetes.

Spoud.

Spoud. *Well let them passe, and now to the nomber of the heauens, whiche you affirme to be .x.*

Philoni. *You haue ryghtly spoken.*

Spoud. *I remember among other thinges that I haue redde in Diodorus, howe that the Ægiptians supposed there were but eyght heauens: and that by this perswasion. They gaue to the seuen Planetes .vij. heauens. And bycause they perceiued that heauen (whiche you call the firmamēt) to cary the fixed sterres in it, and to kepe one vniforme order and distaunce in rysing, none steed, and going downe: to circuit th'earth also in. 24. houres: and finally, to cary the heauens of the Planetes, by his swiftnes about th'earth with him, contrary to their naturall motion, they supposed (of whose mynde I also am) that there ware but eight heauens. And that, which you call the eight heauen, they name primum mobile.*

The Ægiptiās found out but 8. heauens.

Philo. *You may not to rashely addicte your selfe to any of their opinions, before you are certaine they are eyther trew, or els receiued as moste probable. For by the lyke reason, I can compell you to confesse there are. ix. heauens, as Ptolomæus affirmeth. But for shortnes of time, and that it sumwhat swaruith from our purpose, I wyll omytte it: and leane to th'authoritie of the famous king, and graue Philosopher Alphonsus: whose name by his trauell, is made immortall.*

Ptolomæus found out the 9. heauen.

Alfonsus first founde the. 10 heauen out.

Spoud. *Thus I perceiue your saiynge to be verified (when you excused the olde writers) that tyme, bryng all thinges to their perfection. But I haue redde also of an heauen, whiche in greke is named* Ἐμπύρεον, *Empyreū.*

Philo.

Philo. *It is so named of the wonderful brightnes, and beautie. But because it is imoble, and without any mouig I exclude it out from the nũber of the mouable heauẽs: and that, as not seruing to our purpose. And thus you haue learned what the worlde is, and also the heauenly region. But for the redier conceiuing of that whiche is now spoken, behold the figure insuing.*

Spou. *Wil it please you now to procede with th'elemẽtarye region, which you declared to be th'other parte of the world?*

Philo. *Before we shall take this part in hande (for the easier auoyding often repetitiõ of one thing) I wyll giue you some introduction into the celestiall sphere, touching such circles as must of necessitie serue in this arte.*

Spou. *And that fault haue troubled, yea right excellent authors, for they obseruig no methode, were cõpelled to repete one thing diuers, and sondry times. But because you made mention of a sphere, maye it please you to make definition of it?*

Philo. *All ſuche as haue wryten hereof, do accorde in one as Theodoſius, Proclus, Euclyde, Orontius, Iohn Halifax our worthy countryman, (called alſo Iohn de ſacroboſco.) &c. But as well for th' authoritie, as alſo elegancie, I wyll repete vnto you Theodoſius definition, whoſayth in this wyſe.*

Theodoſius.
Proclus.
Euclide.
Orontius.
Iohn Halifax

Lib. 1. prop. 1. Σφαῖρα, ὅταν σχῆμα στερεὸν ὑπὸ μιᾶς ἐπιφανείας περιεχόμενον, πρὸς ἣν ἀφ' ἑνὸς σημείου τῶν ἐντὸς τοῦ σχήματος κειμένων, πᾶσαι αἱ προσπίπτουσαι εὐθεῖαι, ἴσαι ἀλλήλαισ εἰσίν.

Sphæra eſt figura ſolida cõprehẽſa vnâ ſuperficie, ad quã ab vno eorũ pũctorũ quæ ĩtra figurã ſũt, oẽs rectæ lineæ ductæ ſũt inter ſe æquales

A ſphere is a ſound body, conteined within one platte forme and bounde, vnto whiche all right lynes drawen from the Center, (they being cõteyned within the figure) are founde æqual amõg thẽ ſelues.

To the vnderſtanding of whiche definitiõ, is requiſite to knowe both what the center, axe tree, and diameter of a ſphere is.

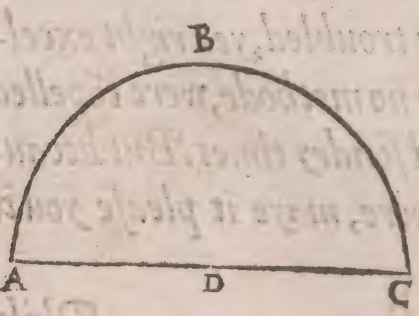
Spoud. *Now I perceiue the reading of the pathway doth not a lytle helpe me, in vnderſtanding this definitiõ of Theodoſius: as alſo ſuche wordes, whiche are vſuall in Geometry. But what is this axe tree of the ſphere? for I vnderſtand that by a center is nothing mẽte, but a prick in the myddes of any circumference.*

What a cẽter is.

Philo. *Theodoſius, calleth the axe tree, a certain right line drawen by the center, both endes of it ending in the plat forme of the ſaid ſphere, the ſphere being turned about it: and yet this axe tree to remaine fixid & without motion. As in exãple. Here you ſe A. B. C. to repreſent the halfe ſphere, the axe tree alſo drawen through it is A. D. C. whiche being fixid, & the halfe ſpheare turnynge round*

Lib. 1. prop. 3.

What the axe tree is.



round about, maketh a parfait roũd body. As this figure here placed maketh true mention.

Spoud. *I pray you what difference is there betwixt the diameter of a ſpheare and the axe tree.*

Philo. *I wil ſhowe you, omitting th' auctors names for briefnes. A diameter of a ſphere, or globe, is any lyne drawen thorowe the ſame, goyng by the center of the ſphere, or globe. And ſo there may be (yea and you wyll). xx. diameters, or as many as you pleaſe in a ſphere: but there can be but one axe tree, on whiche the ſphere, or globe, is reuoluid. And this axe tree is voyde of all motion.*

What a diameter is, and how it diſereth from the axe tree aforeſayd.

Spoud. *I wil (and it pleaſe you) make a profe wherby you ſhal perceiue, if I rightly vnderſtãd your meaning.*

Philo. *do you ſo.* Spou. *Here I wyl make a ſphere, in whiche I drawe right lines, frõ the one part of the circũferẽce, by the cẽter, & ſo to th' other. Such right lines, or diameters, are A D: C F: B E: but I do imagine only A. D. to be the axe tree, and imoble.*

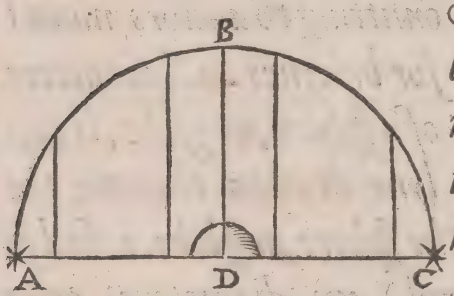
Philo. *Very wel wrought. Now procede we forth. You muſt alſo conſider that the ſphere is deuided, into a right ſphere and into an oblique or crokyd ſphere.*

The ſpheare is taken two wayes. A right ſphere The poles of the worlde what thei are.

they only haue a right ſphere which dwell vnder th' equinoctiall, and haue both the pole arctike, and antarctick in their Horizont.

Spoud. *Do you not call the two pointes or endes of the axe tree, the fornamed poles?*

Philo. *It is ſo, and for firmer printing it in memory, beholde here the type of them that haue a right ſphere.*

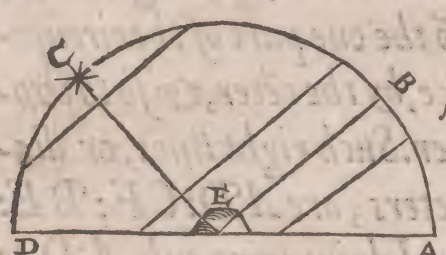


As A. D. C. repreſenteth bothe the axe tree, and the right Horizont: and A. C. the two poles: Yea and B. D. the half parte of th' equinoctiall.

Spoud. *So that a mā inhabiting vnder B. D. which is th' equinoctial, do perceiue both A. whiche is the North pole, and C. whiche is the South, leuell with th' earth, and his verticall point, in the forſaid Æquinoctial.* Philo. *You do well perceyue it.*

Spoud. *Then it foloweth, that where ether of the poles, is eleuated aboue th' earth, they dwell not vnder the æquinoctial, and ſo haue a croked, & an oblique ſphere.*

An oblique or croked ſphere.



Philo. *And that doe this figure perfitly proue. Here C. E. is the halfe of the axe tree aboue th' earth, B. E. is the halfe of th' equinoctial. C. the one pole aboue th' earth. Whiche maketh the halfe ſphere. A. B. C. D. to be oblique, and croked, according to my firſt meanig.* Spou. *I vnderſtād this perfitly*

Philo. *Then is it expediēt for you to cōſider, that this*

ſphere

ſphere doeth in it conteine many Circles.

Spoud. *Your wordes bringe me in à doubt. For I perceiue that à circle, & à ſphere are both rounde, & haue like Centers, & Diameters.*

Phil. *They haue no leſſe, yet they do as greatlye differ as the worlde, & th'earth (of which we made mention) as this definition of Euclid, do manifeſt plainly.*

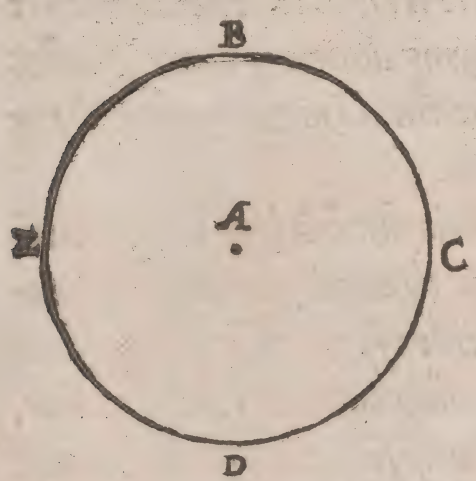
Κύκλος, ἐστὶ σχῆμα ἐπίπεδον, ὑπὸ μιᾶς γραμμῆς περιεχόμενον, ἡ καλεῖται Περιφέρεια, πρὸς ἣν ἀφ' ἑνὸς σημείου τῶν ἐντὸς τοῦ σχήματος κειμένων, πᾶσαι αἱ προσπίπτουσαι εὐθεῖαι ἴσαι ἀλλήλαις εἰσί. *Lib.1.defi.14.*

which Scheubel.excellẽtly (after his maner) trãſlateth.

Circulus eſt figura plana, vna linea compræhenſa, quæ circumferéntia appellatur, ad quam ab vno quodam puncto eorum, quæ intra figuram ſunt poſita, omnes cadẽtes rectæ lineæ inter ſe ſunt æquales.

And is thus much to ſay with vs.

A Circle is à plaine and flat figure comprehended within one line, which is called à circumference: vnto whiche, if lines be drawne from the Center, or poynt of the circle, vnto the circumference, they beinge conteined within the ſame, are found to be equall one to an other.



As in this example. A. is the center of the Circle: B. C. D. E. the Circumferent line. &c.

Spou. *By theſe wordes I finde à twofoulde difference betwixt à ſphere, & à circle. Firſt, that à circle is à playne, & flat figure, & à ſphere of roũde fourme, like vnto à Ball. And then that à Circle is cõpræhended within one line, & a ſphere within one plat fourme. But now I pray you declare ſuch Circles, as are imagined to be in the ſphere of the worlde, & moſt neceſſary for an introduction.*

How a ſphere and a Circle differ.

Phil. *In This sphere chiefly x. Circles are imagined: Of whiche 6. be great, & 4. be small: whiche in order I will set out. And therfore answer me: Haue you not read among your authours of the Horizõt circle? we will beginne with that firste, because necessitie inforseth suche order.*

The principall circles in the Sphere of the world are x. in numbre.

Spou. *Yes sir: Proclus defineth it in this sorte.*

What the Horizont is. Ὁρίζων δέ ἐστι κύκλος ὁ διορίζων ἡμῖν τό τε φανερὸν καὶ τὸ ἀφανὲς μέρος τοῦ κόσμου: καὶ διχατομῶν τὴν ὅλην σφαῖραν τοῦ κόσμου, ὥστε ἡμισφαίριον μὲν ὑπὲρ γῆν ἀπολαμβάνεσθαι, ἡμισφαίριον δὲ ὑπὸ γῆν.

Horizon est circulus qui diuidit nobis mundi partem, quæ videtur, ab ea quæ non apparet; & qui ita in duas partes æquales totum discindit mundi globum, vt eius dimidia pars altera supra terrã extet, dimidia altera sub terra sit.

Which sounded in our language in this maner.

The Horizont is a Circle which deuideth, & parteth that part of the world which we see, from that which do not appere: & which parteth the worlde in two equall partes, in suche facion, as th'one halfe is euer aboue th'earth, th'other alway vnder.

Phil. *Th'use of this Circle is right excellent, for by it we finde out the rysing, & goyng downe of euery Planet & Starre. In this Horizont the daye & nyghte, haue also theyr beginning, & ende.*

Spou. *So that this Horizont is a lyne imagined to go rounde about by the face of th'earth, parting the heauens in two partes, and is saide of ὁρίζω, whiche signifieth to decerne, or ende. But standing on an hie Mountaine, steple, or suche lyke thing, shal I se but halfe the heauẽs,*

A question.

Philo. *Yes verely, you shall see more then an Hemisphere (for so call they the halfe sphere) as also beynge in a valley and lowe place, you shall not see youre Hemisphere totally. And althoughe you may obiecte, that this Horizont deuideth not the heauen in two equal portiõs,*

Th'answere.

yet it

yet it is proueth nothinge: for th' Astrologians alowe no suche Horizont.

Spoud. And is this Horizont à fixed Circle or not?

Philo. It is fixed, and without motion.

Spou: It should seme contrary. For I beynge at London haue one Horizont, and goyng to Andwerpe, haue an other, and so at Colein an other, and at Heydelberge another. &c. *An obiection*

Philo. I confesse no lesse, but that proueth nothinge that the horizont moueth, for loke into what errour you shoulde fall: you muste graunte (if the horizont moue) that with the turning of the heauens, your horizont Circle must come ouer your verticall poĩt, once in 24. houres. *Th' aunswere.*

Spoud. Nay, I will not graunt suche absurditie in any case: wherfore I see that it is my chaũgyng that maketh me to haue à newe horizont, and not the horizont to moue with me.

Phil. You hit the naile on the head (as the saying is) Nowe your authour deuideth the horizont, lyke to the sphere: that is, into à ryght horizont, and into â croked or oblique. *The Horizont deuided into two partes.*

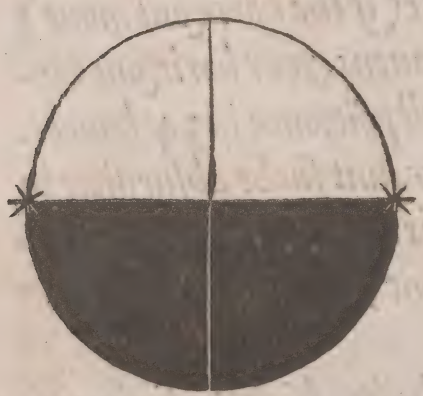
Spoud. What be they that haue a right horizont? *A right Horizont.*

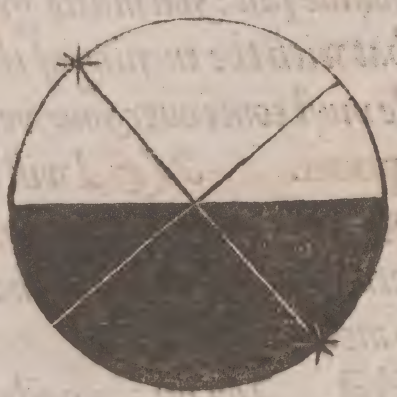
Phil. They haue a right horizont, whan as this circle crosseth th' equinoctiall rightely in two partes, and they haue a croked horizont, whan eyther of the Poles is aboue th' Earth, and th' other vnder: suche is oure Horizont whiche inhabit Europe. But for the better vnderstanding, I haue made here a figure, in whiche C. A. and E. is th' equinoctiall. And because B. A. D. crosseth it *A croked Horizont.*

This Picture ſheweth the fourme of a right Horizont.

ſith it rightely: Ft is the right Horizont. Alſo B. D. are the two Poles of the worlde: & becauſe B. is eleuated aboue th'earth, it maketh F. A. G. to be th'obliquè Horizont, as theſe ij. pictures here placed do ſhewe.

This Figure repreſent a croked or oblique Horizont.





Spoud. *Seyng that the Horizont ſemeth onely neceſſary for to know the true riſinge, & goynge downe of the Sonne, Mone, Planetes, & fixed ſterres, it can not any thynge helpe for to knowe whan anye of them are at the hieſt aboue the Horizont for that daye, in whiche place whan as the Sonne cõmeth: it is midday. For Ft perceiue euery Planet, & Starre, to aſcende by litle, & litle aboue th'earth, vntyll they be at the hieſt: & then in lyke maner do continuallye deſcende, vntill they come to the Horizont in the Weſt.*

Phil. *For this & diuers other occations (in times paſt)*

past) they imagined a circle whiche they called the meridian circle and Proclus, in this sorte setteth it out.

Μεσημβρινὸς δέ ἐστι κύκλος, ὁ διὰ τῶν τοῦ κόσμου πόλων καὶ τοῦ κατὰ κορυφὴν σημείου γραφόμενος. ἐφ' οὗ γενόμενος ὁ ἥλιος τὰ μέσα τῶν ἡμερῶν, καὶ τὰ μέσα τῶν νυκτῶν ποιεῖται.

What the Meridian is.

Meridianus circulus is est, qui describitur per polos mũdi, & per verticis punctum, in quo cum fuerit sol, facit diei noctisq; dimidium.

The meridiane or middaie circle (saith he) is describid and drawen by the poles of the worlde, and the point directlye ouer oure heades called Zenit in whiche whan the Sonne entreth (whiche is twyse in a naturall day) it is mydday, or mydnight.*

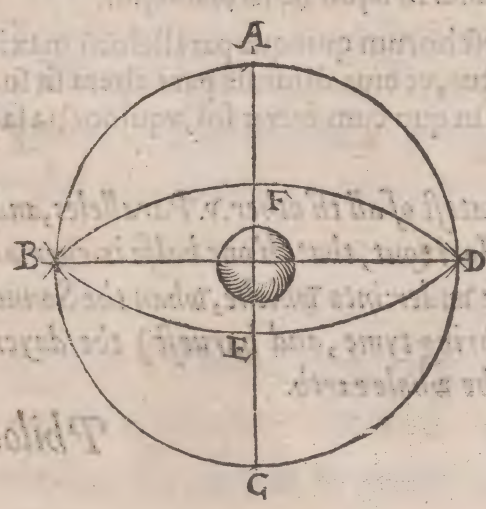
** Zenit is that point or prick imagined to be directly ouer our heades & is alwaye. 90. degrees frõ the East, South, Weast, and North. Lib. 1. prop. 3.*

Spoud. *Yea and this meridiane by Theodosius probation, shall in all places crosse rightly the Horizont, & is also a fixid circle as the Horizont is.*

Philo. *And that was one of the greatest reasons (if I be not deceiued) whiche prouoked the Astronomers to make their computation from midday. And as many as dwell either plaine North, or South, haue the same meridiane that you haue: and suche as are either East, or West, haue an other meridian, and not the same whiche you haue.*

Spoud. *Then by your wordes I gather that the inhabitantes whiche be directly vnder vs (the Geographers name them Antipodes) are vnder the same meridiane lyne, that we be.*

Antipodes.



Philo. *Verely it is true. But we wyll omyt the declaration of them vntyll our next metinge, and I wyll gyue you example of the meridiane circle, ioyned with the Horizont. Here you se A. E. C. represent*

preſent the verticall point, B. D. the poles of the world, by whiche and A. (being the vertical circle) is the meridiã circle A. B. C. D. delineated and drawẽ. Whiche croſſeth alſo B. E. D. F. being the Horizont circle.

Spoud. *This circle I do wel remembre, but I do furder perceiue that the Sõne riſeth not alway at one time, and therfore is ſometime longer or he come to the meridian, and ſometime ſhorter, ſo that the daies increaſe and decreaſe continually, except twyſe euery yeare. (Which is to ſaye the .x. of Marche, and the .xiiij. of Septẽber) and then the daies, and nightes are equall, and he ryſeth directly Eaſt, and ſetteth playne Weſt: whiche in other times, he do not, as we may dayly vnderſtande.*

Philo. *The diference of the tymes, ingendred by the courſe of the Sonne, you ſhall eaſely fynde by th' quinoctiall.*

Spoud. *you renew that, whiche almoſte was out of my memory. For I reading the forſayd Proclus, remẽber he maketh mention of th' equinoctiall circle in this wyſe.*

What th' quinoctiall is.

Ισημερινὸς δὲ κύκλος ἐστὶν ὁ μέγιστος τῶν πέντε παραλλήλων κύκλων, ὁ διχοτομούμενος ὑπὸ τοῦ ὁρίζοντος, ὥστε ἡμικύκλιον ὑπὲρ γῆν ἀπολαμβάνεσθαι, ἡμικύκλιον δὲ ὑπὸ τὸν ὁρίζοντα, ἐφ' οὗ γενόμενος ὁ ἥλιος τὰς ἰσημερίας ποιεῖται τήν τε ἐαρινὴν καὶ τὴν φθινοπωρινήν.

Aequinoctialis autem circulus eſt horum quinque parallelorũ maximus, ita ab horizonte in duo ſectus, vt eius dimidia pars altera ſit ſupra terram, altera vero ſub terra: in quo cum fuerit ſol, æquinoctia facit duo, vernũ & Autumnale.

Th' equinoctiall is a circle greateſt of all th' other .v. Paralleles, and is ſo deuided, and parted of the Horizont, that th' one halfe is euer aboue th' earth, and th' other halfe vnder: into whiche, whan the Sonne enter (whiche is twyſe yearly ſpring tyme, and harueſt) the dayes and nightes are equall thorowe the whole earth.

Philo.

Philo. *Moreouer you muſt further conſider that this circle difereth from the other two afore ſaid becauſe it is mouable, and caried about with the heauens, where the other are ſtedfaſt and fixid.*

Spoud. *Jt muſt nedes ſo be. But are not the poles of this circle, the poles of the worlde?*

Philo. *Yes verely, and they that dwell vnder th'equinoctiall haue the ſignes equally aſcending, and deſcending, whiche ſhould not be, if the poles of it, did varie frō the poles of the worlde. That they do aſcende, and alſo deſcend equally, Lucan th'excellent Poet, do aptly ſet out, where he deſcribeth Cato his voyage into Lybia, which is towarde th'equinoctial, in theſe verſis annexid.* Lib. 9.

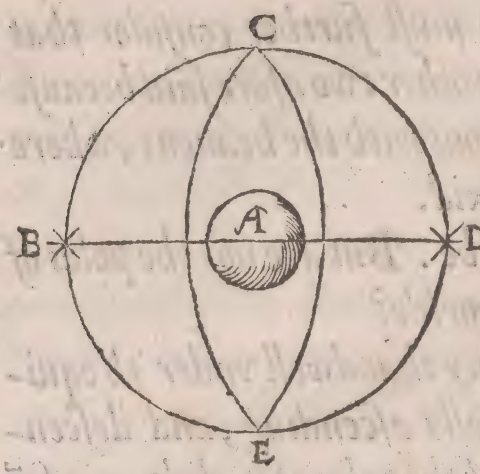
Non obliquè meant, nec Tauro rectior exit
Scorpius, aut Aries donat ſua tempora Libræ.
Aut Aſtrea iubet lentos deſcendere Piſces.
Par Geminis, Chiron: & idem quòd Carcenus ardens
Humidus Aegoceros, nec plus Leo tollitur Vrna.

The meaning of whiche verſis in Engliſh meater is,

The ſignes in equall tymes, do aſcend and deſcende:
The Ballance and the Ramme, the Scorpion and Bull.
The Twinnes and Archer eke, the Crabe and Goate defende:
The fearſe Lyon, the Pot with water that is full.
The Virgin with her braunche, ſoner cannot apere:
Then the Fyſſhes by courſe approche to the weſt nere.

Spoud. *Jf ſhall and it pleaſe you make a proue hereof as I did in the other, wher by you may correcte my error, if any ſhall folowe: and then you may procede with the other circles.* Philoni. *Doe you ſo.*

Spoud. *Jf haue here made a figure in whiche C. E. do repreſent th'equinoctiall. B. A. D. the axe tree of the worlde. B. the north pole or arcticke, and D. in lyke ſort th'antracticke,*



Th'use of the Horizõt, Meridian, and æquinoctiall Circles.

th'antarcticke, whiche are also the poles of th'equinoctiall.

Philo. *I do muche commende you. Nowe further more you maye consyder, that lyke as the rising, and going downe of the Sonne, Moone, and Planetes, is founde out by the helpe of the Horizont: their true height by the meridian circle: and the varietie of tyme by th'equinoctiall: (comparing the quantitie of the daye present, vnto the quantitie of the day whan as the Sõne is in th'equinoctial) so there is also a proper path, or way, in whiche the other Planetes, as well as the Sonne do finyshe their reuolutiõ, and course, according to their true tyme. Whiche circle is very nedefull for Geographers, as hereafter you shall vnderstande.*

Spoud. *I pray you sir, is not that the circle, whiche I haue in a starry nyght decernid lyke a brode gyrdle full of starres, in whiche also in some part is the mylkey way called as I suppose* γαλαξίας *of Ptolomæus, and of Tully lacteus orbis?*

Philo. *It is the very same, and Proclus describeth it in these wordes.*

What the zodiack is.

Λοξὸς δὲ ἔστι κύκλος ὁ τῶν ιβ ζωδίων. αὐτὸς δὲ ἐκ τριῶν κύκλων παραλλήλων σύνεστηκεν, ὧν ὁ μὲν τὸ πλάτος ἀφορίζειν λέγεται τῦ ζωδιακῦ κύκλυ, ὁ δὲ διὰ μέσων τῶν ζωδίων καλεῖται. οὗτος δὲ ἐφάπτεται δύο κύκλων ἴσων καὶ παραλλήλων, τῦ μὲν θερινῦ τροπικῦ κατὰ τὴν τῦ καρκίνυ πρώτην μοῖραν, τῦ δὲ χειμερινῦ τροπικῦ κατὰ τὴν τῦ αἰγοκέρωτος πρώτην μοῖραν. τὸ δὲ πλάτος τῦ ζωδιακῦ κύκλυ ἔστι μοῖρα ιβ. λοξὸς δὲ κέκληται ὁ ζωδιακὸς κύκλος, διὰ τὸ τέμνειν τοὺς παραλλήλους κύκλυς.

Circulus autem obliquus est zodiacus, qui duodecim signa continet, ip-

net, ipseque ex tribus circulis parallelis constituitur: quorũ duo latitudinẽ eius definiunt, tertius vero per media signa ducitur. Hic attingit duos circulos æquales & parallelos, nẽpe Aestiualem tropicũ in prima parte Cancri, & Hiemalem in prima parte Capricorni. Latitudo autem Zodiaci est partium duodecim, & dicitur obliquus hic circulus, propterea quod parallelos secat circulos.

*The crokyd, oblique, or thwarte circle, is called the Zodiacke, whiche in it conteyne the.xij. Signes, and is made of thre parallele circles, of whiche two do conteyne in them the bredth, and latitude: the third*do deuide the Signes equally in the myddes. This Zodiack, extendith vnto two equidistant circles, or paralleles. That is to say the somer tropike, in the beginning of Cancer: and the winter in the beginning or first degree of Capricorne. The latitude and bredth of the Zodiack is.xij. degrees, and it is called thwarte or croked, because it crosseth the parallele circles.*

*This lyne is called the ecliptick, because in it is the cõtinual course of the Sõne and that all Eclypses as well of him as of the mone can not be but in this lyne.

And here you must note for eschewing further error, that th' author menith by crossinge the parallele circles, that the zodiack goeth ouerthwarte them, and not rightly as th' equinoctiall, and the right Horizont doth.

Spoud. *And this circle, is deuided into. xij. equall partes whiche you call signes.*

Philo. *You haue truly spoken: yea and euery signe, is deuided into. xxx. partes, whiche they call degrees: and euery degree, into. lx. minutes. &c. But this serueth rather for Astronomers.*

What a signe is.

What a degre is.

Spoud. *By your wordes I gather the lengthe of a degree to be the.360.parte of the heauen (for. xij. tymes 30. maketh.360.) and not any determined, or appointed measure, as a yarde, a forlong, a myle. &c.*

What a minute is.

Philo. *Vnto this circle and th' equinoctiall, al the mouing of the Planetes, and fixed starres is referred. For by them we fynde out their longitude, latitude, and also*

th'eleuation of ether poles, whiche is so necessary in this arte, as without it you shall little or nothing profite. But nowe I wyll set before your eyes the signes, with their names in Greke, Latine, and Englishe, adding also certaine characters of euery one of them, which the Astrologians do vse both in their wryting, also in their instrumentes.

	1	2	3	4	5	6
Septemtrional signes.	Κριὸς,	Ταῦρος,	Δίδυμοι,	Καρκίνος,	Λέων,	Παρθένος.
	Aries,	Taurus,	Gemini,	Cancer,	Leo,	Virgo,
	Rãme,	*Bulle,*	*Twinnes,*	*Crabbe,*	*Lion,*	*Virgyn,*
	♈	♉	♊	♋	♌	♍
	7	8	9	10	11	12
	Χηλαί,	Σκόρπιος,	Τοξότης,	Αιγόκερος	Ὑδροχοός,	Ἰχθῦς,
Meridionall signes.	Libra,	Scorp.	Sagitta.	Capricor.	Aquari.	Pisces.
	Balaũ.	*Scorpiõ,*	*Archer,*	*Goate.*	*watermã.*	*Fisshes.*
	♎	♏	♐	♑	♒	♓

Spou. *These names I haue often red in Homer, Sophocles, and other greke Poetes: and the latin, in Virgil, Ouide, Horace, Palingenius, and euery other Poet wel neare do make of them mencion: and I do perceiue th'use of this circle to be very expediẽt. For of it consisteth the quantitie of the yeare, the .iiij. tymes of the same, as the Spring, Somer, Harueſt, Wynter. But I perceiue also other configurations, and formes, as well out of the zodiacke, as also in it. And the Poetes make mẽtion of many of them, as Charles wayne, the Dragõ, Bootes, Th'egle, the flieng Horse, the seuen Starres, the great Dog, and others: of whiche you make no mention.*

The vse of the zodiack.

Philo. *No, nether do I intende, leſt that I shall seme to espie a mote in an other, and not a beame in mine own eye. For I wyll digresse as litle as possible I may, frõ our*

A Table

A TABLE OF MANY NOTABLE FIXED STERRES VVITH THER TREVV LONGITVDE, LATITVDE, AND DECLINATON, *faithfully rectified vnto the yeare of our Lorde.*

1559.

¶ The names in Englyshe	¶ The names in Latine	The names in Greke.	The Longitude.			The Latitude.			Declination. and Magni.			
			S	D.	M.	D.	M.	P.	D	M	P	M
The Whales backe	Dorsum Cæti,		♈	6	6	15	40	M	12	11	M	2
The Whales belly	Venter Cæti.		♈	16	2	20	0	M	12	20	M	2
Aries horne.	Cornu Arietis.		♈	27	42	7	20	S	17	19	S	3
The Rammes head.	Caput Arietis.		♉	1	46	10	0	S.	21	16	S	3
The Bulles eye.	Oculus Tauri.	Λαμπαδίας.	♊	3	42	5	10	M	15	42	S	1
Orions left foote.	Orio. pes finist.		♊	10	12	31	30	M	9	14	M	1
Orions left shoulder.	Orion. hu. sini.		♊	11	26	17	30	M	4	37	S	2
First in Orions gyrdle.	Cing. Orio. pri.		♊	16	22	24	20	M	1	19	M	2
Second in Orions gyrdle.	Cing. Orio. se.		♊	18	22	24	50	M	1	49	M	2
Orions right shoulder.	Orio. hu. dex.		♊	23	6	17	0	M	6	18	S	1
The great Dogge.	Canis Maior.	Τείριος,	♋	8	42	39	10	M	15	50	M	1
The lesser Dogge.	Canis Minor.	προκύων.	♋	20	12	16	10	M	6	4	S	1
Brightest in Hydra.	Lucida Hydræ.		♌	21	2	20	30	M	4	47	M	2
The Lions neck.	Ceruix Leonis.		♌	23	16	8	30	S	21	59	S	2
The Lions harte.	Regulus.	Βασιλίσκος.	♌	23	32	0	10	S	14	3	S	1
The Lions back.	Dorsum Leonis		♍	5	16	13	40	S	22	31	S	2
The Lions Tayle.	Cauda Leonis,		♍	15	32	11	50	S	16	49	S	1
The Crowes head.	Caput Corui.		♎	5	0	19	40	M	19	53	M	3
The Crowes ryght wyng.	Ala dextra Cor.		♎	9	36	14	50	M	17	8	M	3
The Virgins Spike.	Spica Virginis.	Στάχυς.	♎	17	42	2	0	M	4	54	M	1
Betwixt Bootes thyghes.	Inter cox. Boo.		♎	18	6	19	40	S	22	9	S	1
South Ballaunce.	Lanx Merid.		♏	9	2	0	40	S	13	44	M	2
North Ballaunce.	Septemtriona.		♏	13	12	8	30	S	7	33	M	2
The Scorpions hart.	Cor Scorpij.	Ἀντάρης.	♐	3	42	4	0	M	24	47	S	2
Hercules Head.	Caput Herculis		♐	8	42	37	30	S	15	20	S	3
The Serpentes head.	Caput Ophi.	Κεφάλη ὀφιούχυ	♐	15	52	36	0	S	14	7	S	3
The Egle.	Aquila.	Ἀετός.	♑	24	52	29	10	S	7	27	S	2
Capricornes Tayle.	Cauda Capri.		♒	17	22	2	10	S	14	13	M	3
In Aquarius legge	Crus Aquarij.		♐	2	20	7	30	M	15	52	M	3
Pegasus shoulder.	Hū. Pegasi.		♐	17	42	29	40	S	13	0	S	2

first institution. But I wil geue you here a table of many notable fixed starres, which are profitable for the trieng out of the latitude of any country and place.

Spoud. *This table seruith vnto smal vse (if my authors deceiue me not) onlesse that I haue in lyke sorte the declination of them.*

Philo. *You saye ryghtly, and to satisfie your expectation, I wyll also place here a table of declination of th'ecliptycke lyne from th'equinoctiall, whiche shall extende vnto. 23. digrees. 28. minutes, the trew declination of the sonne, of this our age.*

Spoud. *I pray you sir, what call you the declination of the sonne, or other planet and sterre?*

Philo. *It is no other thing then the distaunce of anye sterre from th'equinoctial vnto his true place in the zodiack. And here marke that euery sterre hath two declinations, the one is hauing ther course in the zodiack frō the beginning of Aries, vnto th'ende of Virgo, and they are North frō th'equinoctial. Th'other from the beginning of Libra, vnto th'ende of Pisces, and they are said to haue their declination south from th'quinoctiall.*

Euery Planet haue two declinations.

Spoud. *haue this declination of the sonne, bene alway one, or it doth varie?*

Philo. *I wyll shewe you, in the tyme of Ptolomæus as (his workes do testifie) the sonnes greateſt declination from th'equinoctiall was. xxiij. degrees. lj. minutes, and xxx. secondes. Almæon found it. xxiij. degrees. xxxiij. mynutes, and. xxx. secondes. Iohannes de monte Regio, tried it to be. 23. and but. 30. minutes. And George Pour bachius*

The diuersitie of the Sonnes declinatiō, frō Ptolomæus time, vnto our age.

bachius.23.degr.&.28.mi.which agreeth with our time

Spoud. *This diuersitie of obseruatiõ, may arise rather of the instrumentes not exactly made, then that he do so vary in his declination.*

Philo. *Nay verely. I attribute the cause here of vnto that mouing of the heauẽ which is called of Tebitius & Alfonsus, motus trepidationis.*

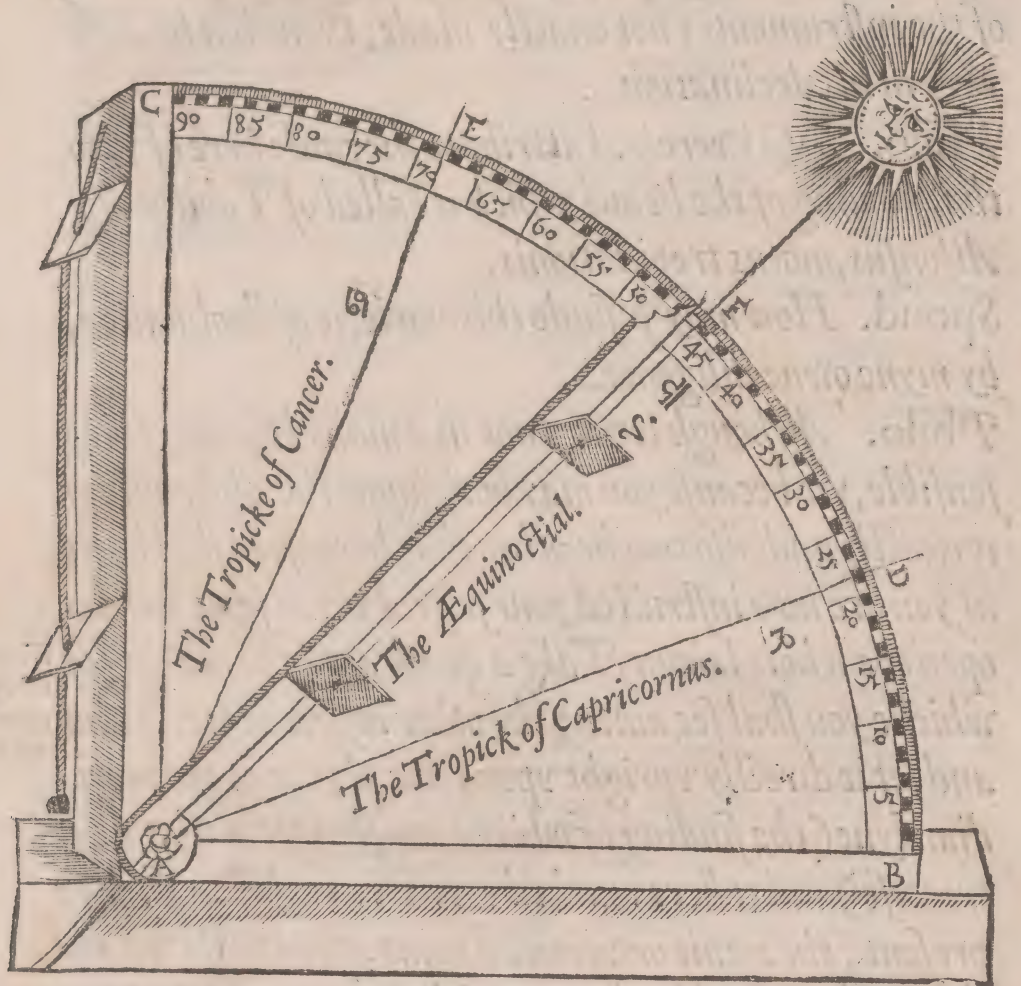
Spoud. *How may I finde this varietie of declination, by myne owne diligence.*

Philo. *Although it vary not in a mans lyfe any thing sensible, yet because you may both know the obseruing of it exactly and also teache other that hereafter shal lerne as you are now instructed your selfe: I wil in fewe wordes open the whole labour. Take a quadrant (the making of whiche you shal see among the other instrumentes) and and set it directly vpright vpon some playne in the meridian lyne (the finding of whiche you shal see in the next treatise) and is here marked A. B. as also C. A. do re present, the zenit or verticall point, then rayse vp and downe the ruler (hauing two sight holes made in it) vnto the sonne, whan as he is in the meridian line: and obserue diligẽtly that height, in the circle of degrees noted in your quadrant, frõ B. to C. the. xi. or. xii. day of Decẽber, which is B. D. vntill you finde he goeth no lower: and againe in like case the. xi. or. xij. of Iune, vntyll you perceiue he increaseth nothinge in height, and is noted here B. E. and so the distaunce of D. E. is the distaunce of the. ij. tropick Circles.*

How to findẽ out by Instrument the Sonnes Declinatiõ

Spoud. *What meane you by those tropick circles?*

Philo. *You shall knowe, our conclusion ended. This distaunce in our dayes is founde. 46. degrees. 56. minu-*



tes, which beyng parted in two equall parts, & reconed from th' Equinoctiall. B. F. sheweth the Sonnes greateste declination Northwarde from the forsaid Circle, 23. degrees. 28. minutes. And in like case Southwarde in Winter. And thus shall you alwaies find his declination.

Spoud. *This rule will I put in practise whan the tyme of the yeare doeth insewe.*

Phil. *Well now behold this table of Declinatiõ, which shall serue thy vse more largely thẽ Orontius, or D. Recordes Table: & is not so proplixe, as E. Reignholdes.*

AT A-

A TABLE OF DECLINATION

of th' Ecliptike, in Degrees, Minutes, & Secõdes, from th' Equi.
noctiall, answeryng to the Sonnes greatest Declinatiõ. 23. Deg. 28. Minu.

Degrees.	Aries. ♈ Libra. ♎			Differẽ.		Taurus. ♉ Scorpius. ♏			Differẽ.		Gemini. ♊ Sagittarius. ♐			Differẽ.			
Deg. Mi.	Deg.	Mi.	Se.	Mi.	Se.	Deg.	Mi.	Se.	Mi.	Se.	De.	Mi.	Se.	Mi.	Se.	De.	Mi
0 0	0	0	0	0	0	12	14	48			20	36	15			30	0
0 20	0	8	41			12	21	17			20	40	2			29	40
0 40	0	17	22			12	29	6			20	43	47			29	20
1 0	0	26	2			12	26	12	14	1	20	47	29			29	0
1 20	0	34	43			12	43	16			20	51	8			28	40
1 40	0	43	24			12	50	18			20	54	45			28	20
2 0	0	52	4			12	57	19			20	58	20			28	0
2 20	1	0	45	1	9	13	4	17			21	1	52	22	1	27	40
2 40	1	9	26			13	11	14			21	5	21			27	20
3 0	1	18	6			13	18	10			21	8	48			27	0
3 20	1	26	46			13	25	3			21	12	12			26	40
3 40	1	35	25			13	31	54			21	15	34			26	20
4 0	1	44	5			13	38	42	15	6	21	18	54			26	0
4 20	1	52	43			13	45	28			21	22	11			25	40
4 40	2	1	22	2	19	13	52	13			21	25	25			25	20
5 0	2	10	1			13	58	57			21	28	37			25	0
5 20	2	18	39			14	5	37			21	31	46			24	40
5 40	2	27	17			14	12	16			21	34	53			24	20
6 0	2	35	53			14	18	53			21	37	58			24	0
6 20	2	44	30	3	9	14	25	27			21	40	59			23	40
6 40	2	53	6			14	31	59	16	0	21	43	58			23	20
7 0	3	1	42			14	38	31			21	46	56			23	0
7 20	3	10	17			14	44	59			21	49	51			22	40
7 40	3	18	52			14	51	25			21	52	42			22	20
8 0	3	27	27			14	57	50			21	55	31			22	0
8 20	3	36	0	4	8	15	4	12			21	58	17			21	40
8 40	3	44	33			15	10	32			22	1	1			21	20
9 0	3	53	6			15	16	49			22	3	43			21	0
9 20	4	1	38			15	23	4			22	6	22			20	40
9 40	4	10	9			15	29	18			22	8	59			20	20
10 0	4	18	40			15	35	30	17	2	22	11	33			20	0
10 20	4	27	10	5	6	15	41	39			22	14	4	23	1	19	40
10 40	4	35	38			15	47	46			22	16	33			19	20
11 0	4	47	7			15	53	51			22	19	0			19	0
11 20	4	52	34			15	59	53			22	21	24			18	40
11 40	5	1	1			16	5	53			22	23	45			18	20
12 0	5	9	27			16	11	52			22	26	4			18	0
12 20	5	17	51	6	4	16	17	47			22	28	20			17	40
12 40	5	26	15			16	23	41			22	30	34			17	20
13 0	5	34	39			16	29	33			22	32	45			17	0
13 20	5	43	1			16	35	22	18	1	22	34	54			16	40
13 40	5	51	23			16	41	9			22	37	0			16	20
14 0	5	59	43			16	46	53			22	39	3			16	0
14 20	6	8	2	7	0	16	52	35			22	41	4			15	40
14 40	6	16	21			16	58	15			22	43	2			15	20
15 0	6	24	39			17	3	53			22	44	59			15	0
15 20	6	32	55			17	9	28			22	46	52			14	40
	Piſces. ♓ Virgo. ♍			Diffe.		Aquarius. ♒ Leo. ♌			Diffe.		Capricorn ♑ Cancer ♋			Differ.		Degries.	

THE SECOND PARTE OF THE

Table of Declination of th'ecliptick, from th'Equinoctiall.

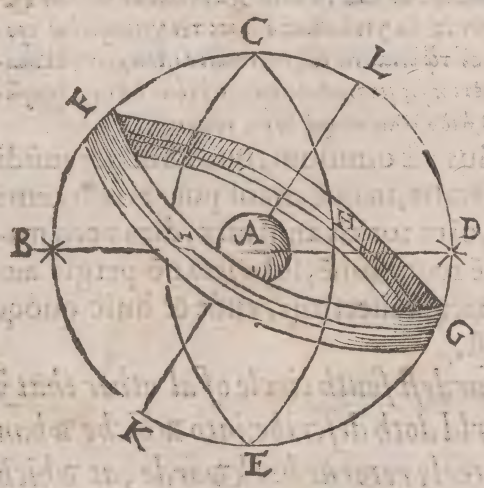
Degrees.	Aries. ♈ Libra. ♎			Differē.		Taurus. ♉ Scorpius. ♏			Differē.		Gemini. ♊ Sagittarius. ♐			Differē.			
Deg.	Mi.	Deg.	Mi.	Se.	Mi.	Se.	Deg.	Mi.	Se.	Mi.	Se.	De.	Mi.	Se.	Mi.	Se.	De.	Mi
15	20	6	32	55			17	9	28			22	46	52			14	40
15	40	6	41	10			17	15	1			22	48	43			14	20
16	0	6	49	25			17	20	33			22	50	31			14	0
16	20	6	57	37			17	26	2			22	52	17			13	40
16	40	7	5	49	8	5	17	31	29			22	54	0			13	20
17	0	7	14	1			17	36	52			22	55	41			13	0
17	20	7	22	11			17	42	13	19	4	22	57	18			12	40
17	40	7	30	19			17	47	33			22	58	54			12	20
18	0	7	38	26			17	52	50			23	0	28			12	0
18	20	7	46	31			17	58	4			23	1	59			11	40
18	40	7	54	36			18	3	16			23	3	25			11	20
19	0	8	2	41	9	8	18	8	26			23	4	52			11	0
19	20	8	10	43			18	13	33			23	6	15			10	40
19	40	8	18	44			18	18	38			23	7	36			10	20
20	0	8	26	44			18	23	41			23	8	53			10	0
20	20	8	34	42			18	28	42			23	10	8			9	40
20	40	8	42	38			18	33	40			23	11	20			9	20
21	0	8	50	34	10	0	18	38	35			23	12	31			9	0
21	20	8	58	28			18	43	28	20	0	23	13	39			8	40
21	40	9	6	21			18	48	19			23	14	44			8	20
22	0	9	14	13			18	53	7			23	15	46			8	0
22	20	9	22	2			18	57	53			23	16	45			7	40
22	40	9	29	50			19	2	36			23	17	43			7	20
23	0	9	37	38	11	0	19	7	18			23	18	38			7	0
23	20	9	45	23			19	11	57			23	19	30			6	40
23	40	9	53	7			19	16	33			23	20	20			6	20
24	0	10	0	49			19	21	7			23	21	7			6	0
24	20	10	8	29			19	25	38			23	21	51			5	40
24	40	10	16	8			19	30	7			23	22	33			5	20
25	0	10	23	47			19	34	33			23	23	13			5	0
25	20	10	31	23			19	38	56			23	23	50			4	40
25	40	10	38	57			19	43	18			23	24	25			4	20
26	0	10	46	29	12	6	19	47	38			23	24	56			4	0
26	20	10	53	59			19	51	55	21	1	23	25	25			3	40
26	40	11	1	29			19	56	9			23	25	52			3	20
27	0	11	8	58			20	0	21			23	26	17			3	0
27	20	11	16	25			20	4	30			23	26	39			2	40
27	40	11	23	48			20	8	37			23	26	58			2	20
28	0	11	31	10	13	1	20	12	41			23	27	14			2	0
28	20	11	38	30			20	16	42			23	27	28	24	0	1	40
28	40	11	45	49			20	20	41			23	27	39			1	20
29	0	11	53	7			20	24	39			23	27	48			1	0
29	20	12	0	22			20	28	34			23	27	54			0	40
29	40	12	7	36			20	32	26			23	27	58			0	20
30	0	12	14	48			20	36	15			23	28	0			0	0
		Pisces. ♓ Virgo. ♍			Diffe.		Aquarius. ♒ Leo. ♌			Diffe.		Capricorn ♑ Cancer ♋			Differ.		Degries.	

Spoud. *I pray you learne me th'vse of this table.*

Philo. *That I wyll reserue vnto his necessary place?*

Spou. *Then or we procede any further, show me what the poles of the zodiake be, for euery circle haue his proper poles: yea and whether they be all one with the poles of th'equinoctiall.*

Philo. *I will fulfill your request. The poles of the zodiacke, do muche differ from the poles of th'equinoctiall, as you may easely perceiue by this figure here placed. In which I haue made C. H. E. I. for th'equinoctial: F. H. G. I. for the zodiacke, and A. for th'earth. Now if I make B. D. the poles of th'equinoctiall as they must nedes be: thē can thei not be the poles of the zodiack, as herafter you shal heare, but K. L. being the endes of th'axe tree of the sayd zodiack, shall be the poles.*



Spoud. *I vnderstande your mynde. Wyll you now declare vnto me the meanyng of the two tropikes, of which you lately made mencion.*

Philo. *Yea and that right gladly, vsing Proclus authoritie as in the other circles whiche saith.*

What the somer tropick is.

Θερινὸς δὲ τροπικὸς κύκλος ἔστιν ὁ βορειότατος, τῶν ὑπὸ τὸ ἡλίου γραφομένων κύκλων. ἐφ' οὗ γενόμενος ὁ ἥλιος τὴν θερινὴν τροπὴν ποιεῖται. ἐν ᾗ, ἡ μεγίστη μὲν πασῶν τῶν ἐν τῷ ἐνιαυτῷ ἡμέρα, ἐλαχίστη δὲ ἡ νὺξ γίνεται. μετὰ μὲν τοι τὴν θερινὴν τροπὴν, οὐκ ἔτι πρὸς τὰς ἄρκτους παραδεύων ὁ ἥλιος θεωρεῖται, ἀλλ' ἐπὶ θάτερα μέρη τρέπεται τοῦ κόσμου: διὰ τοῦτο καλεῖται τροπικός.

Aestiuus Tropicus, ē circulus oīm quos sol describit, ꝓxime Septētriones vergens, in quo cum fuerit Sol, reuersionem æstiuam facit: Vbi omniū totius anni lōgissima dies, nox vero breuissima habetur. Nam post reuersionē æstiuam, non vltra ad septētriones ꝓgredi Solē

videris, sed ad alteram mũdi partem reuerti: vnde circulus hic, Tropicus appellatus est.

The Somer Tropick (saith Proclus) is the most northely circle which the Sonne describeth, in to whiche whan as he enterith, it is the longest daye, and shorteste nyght in all the yeare. For after this somerlye reuerting, the Sonne is not perceiued to decline farther North, but directly to the contrary cooste: for which cause this circle is called a tropike (or circle of reuerting and turning back.)

Spou. *And what calleth he th'other tropicke?*

Philoni. *The wynter tropike or circle of retorning from the South: as these his wordes folowyng do testifie.*

What the winter Tropick is.

Χειμερινὸς δὲ τροπικὸς κύκλος ἐστὶν ὁ νοτιώτατος τῶν ὑπὸ τὸ ἡλίῳ γραφομένων κύκλων κατὰ τὴν ὑπὸ τὸ κόσμου γινομένην περιστροφήν. ἐφ' οὗ γενόμενος ὁ ἥλιος τὴν χειμερινὴν τροπὴν ποιεῖται. ἐν ᾗ, ἡ μεγίστη μὲν πασῶν τῶν ἐν τῷ ἐνιαυτῷ νὺξ ἐπιτελεῖται, ἐλαχίστη δὲ ἡμέρα. μετὰ μὲν τοι τὴν χειμερινὴν τροπὴν, οὐκέτι πρὸς μεσημβρίαν παραδεύων ὁ ἥλιος θεωρεῖται, ἀλλ' ἐπὶ θάτερα μέρη τρέπεται τοῦ κόσμου, διὸ κέκληται καὶ οὗτος τροπικός.

Hyemalis vero tropicus circulus est omnium, quos Sol per mũdi cõuersionẽ describit, maxime australis, in quẽ cũ sol puenerit hyemalem reuersionẽ facit: vbi maxima oĩm totius anni nox, dies vero minima cõficitur. Nã post hyemalẽ reuersionẽ, sol vltra nõ pergit austrum versus, sed ad alterã mũdi partẽ reuertitur, vnde & huic quoq; circulo tropici nomen inditum est.

The tropick of winter, is the furdest south circle of al other that ỹ sonne by the tournynge of the world doth describe: into whiche whan he doth enter, he maketh his wynterly retorne backwarde, at which season it is the lõgest night in all the yeare, and shorteste day. For after this retourne, the sonne goth not further south, but doth approche to the contrary part of the worlde: for whiche cause, this circle also was called a tropicke circle.

Spo. *Proclus here meaneth (as by the repetitiõ of his wordes I gather) that these two tropikes, ar as it wer the boũdes, & lẽgth of the Sonnes iournay. For goyng from the Sommer tropicke in the begynning of the Crabbe, he directeth his course in the zodiacke towardes Libra in th'equinoctiall: and so leuing it, draweth vnto the Wynter Tropicke in the begynnyng of the Goate, beyonde which he can not goe, but retourneth backward agayne,*

vntyll

vntyll he cum to the head of the Ramme.

Philo. *Jt is so, and by these wordes you maye also gather, that the .iiij. tymes of the yeare, Spryng, Sommer, Harueſt, and Wynter, haue their beginnig in these. iiij. pointes (that is) the two Æquinctiall pointes, and the tropickes.* *The foure tymes of the yeare whereof they take beginning.*

Spoud. *You haue here iust occation to speake of the diuersitie of daies, and nightes, and it please you.*

Philo. *Yet that shalbe omittid vntill we make mentiõ of clymates, and the paralleles: and at this present wyll speake of these circles whiche do deuide as wel Th'equinoctiall, as also the zodiacke, into .iiij. equall partes: so that the Sonne being in any of them do make one of the forsayde tymes.*

Spou. *These circles also are necessarye, but what are their names?*

Philo. *They are called Colures, of which th'one is drawen by the beginning of Aries and Lybra, and of that is named th'quinoctiall Colure, and th'other by the beginning of cancer, and Capricorne, and called therof the solstitiall Colure, and are definid of Proclus in this maner.*

Διὰ τῶν πόλων δὲ εἰσὶ κύκλοι ὑπό τινων κόλουροι προσαγορευόμενοι, ὃις συμβέβηκεν ὑπὸ τῶν ἰδίων περιφερειῶν τοὺς τοῦ κόσμου πόλους ἔχειν. κόλουροι δὲ κέκληνται, διὰ τὸ μέρη τινὰ ἀθεώρητα αὐτῶν γίνεσθαι. οἱ μὲν γὰρ λοιποὶ κύκλοι κατὰ τὴν περιστροφὴν τοῦ κόσμου ὅλοι θεωροῦνται τῶν δὲ κολούρων κύκλων μέρη τινὰ ὅτι ἀθεώρητα, τὰ ἀπὸ τοῦ ἀνταρκτικοῦ ὑπὸ τὸν ὁρίζοντα ἀπολαμβανόμενα. γράφονται δὲ οὗτοι οἱ κύκλοι διὰ τῶν τροπικῶν σημείων, καὶ εἰς μέρη λ. ἴσα διαιροῦσι τὸν διὰ μέσων τῶν ζωδίων κύκλον. *What the two coloures are.*

Per polos mũdi ducũtur circuli, quos aliqui coluros vocãt: quibus accidit, vt in sua circũferẽtia polos mundi habeãt. Coluri vero dicti sunt, ꝓpterea quod eorũ partes quædã non videãtur. Nã reliqui circuli per mũdi cõuersionẽ toti cernũtur colurorũ vero partes quædam nunquàm

nunquàm videntur, eæ scilicet, quas sub horizonte nobis condit circulus Antarcticus. Cæterum ducũtur hii circuli, per puncta tropicorum, & in partes duas æquales diuidunt eum circulum, qui est in zodiaci medio.

There are circles drawen by the poles (whiche some men call) Colures: and conteine in their circumference the Poles of the worlde, & they be named Colures, or trunckid circles, for this consideration, because that some partes of them are not at any tyme sene. The other circles by the turninge of the worlde are all apparantly seene: but some partes of the colures, be neuer decernyd. Suche are these partes as are vnder our Horizont in the circle Antarctike. These circles also are drawne by the .ij. tropike pointes, deuiding the ecliptycke in two equall partes.

Spoud. *Is there yet more circles to be obserued?*

Philoni. *Onely Th'arctike, and Antarctike circle remayneth, and then you haue learned all suche circles of the sphere, as shall serue for our purpose at this present, and therfore I wyll make definition of them.*

What the arctycke circle is.

Αρκτικὸς μὲν ἔστι κύκλος ὁ μέγιστος τῶν ἀεὶ θεωρουμένων κύκλων, ὁ ἐφαπτόμενος τοῦ ὁρίζοντος κατ' ἓν σημεῖον, καὶ ὅλος ὑπὲρ γὴν ἀπολαμβανόμενος. ἐν ᾧ τὰ κείμενα τῶν ἄστρων οὔτε δύσιν, οὔτ' ἀνατολὴν ποιεῖται, ἀλλὰ δι' ὅλης τῆς νυκτὸς περὶ τὸν πόλον στρεφόμενα θεωρεῖται.

Arcticus circulus omnium maximus orbiũ, qui nobis semper videntur, qui attingens vno puncto Horizontem, totus extat super terram: inter quẽ incluſa sydera, nequè oriuntur, nequè occidũt, sed tota nocte mundi lustrare polum spectantur.

The Arctike circle is the greateſt of ſuche circles as do at all times totally apeare: whiche touchinge in one pointe onlye the Horizont, is in all partes aboue th'earth. And all ſterres with in this circle included, do nether riſe, nor yet ſet, but turne round about the pole, all the longe nyght.

Spoud. *What calleth Proclus the antarctike circle?*

What the Antarctickcircle is.

Philo. *I wyll repete his wordes.*

Ανταρκτικὸς δέ ἔστι κύκλος ἴσος καὶ παραλλήλος τῷ ἀρκτικῷ, καὶ ἐφαπτόμενος τοῦ ὁρίζοντος κατ' ἓν σημεῖον, καὶ ὅλος ὑπὸ γῆν ἀπολαμβανόμενος. ἐν ᾧ τὰ κείμενα τῶν ἄστρων διὰ παντὸς ἡμῖν ἔστὶ ἀόρατα.

Antarcticus circulus, est ac parallelus æqualis Arctico orbi, attingẽs Horizõtem vno puncto, & totus sub terra conditus: intra quem, cõplexa sydera nunquàm à nobis cernuntur.

And may aptly be translated into Englisſh as foloweth.

The

The Antarctike circle, is an equall parallele with the circle Arctick, touching the Horizõt in one only point, and is totally vnder the Earth: & the Sterres whiche are within it comprehended, do neuer rise aboue the Horizont.

Spou. *Yet I haue harde, that such as inhabite the South partes of Spaine, & in Calecut, Guinea, & diuers other cũtreis, do see many goodly & bright Serres, yea & the southe Pole figured with sterres like à Crose.*

Phi. *It is as you haue said. But of that we will speake in the treatise of Nauigatiõ, & to retorne to Proclus, he meaneth not that the Antartictick Circle & pole of the same is vnder the Horizõt to all men: but to vs that are on this side th' Equinoctiall, & therefore it is spoken no lesse trewly, then pleasantly of the swete Poët Virgilius.*

Hic, Vertix nobis semper sublimis, at illum — *Lib. 2. Geor.*
Sub pedibus, Stix atra Videt, manesq; profundi.
The northe Pole, Still we haue in sight:
But vnder th' Earth, the South sterre right.

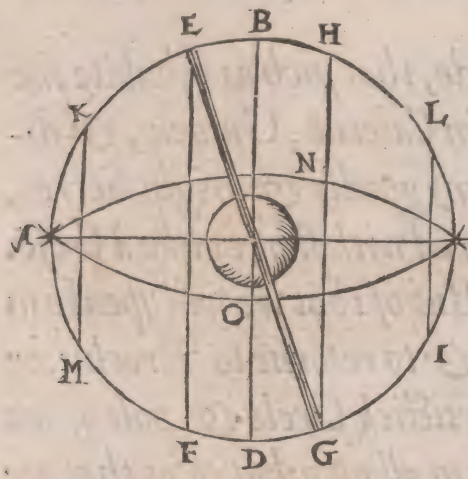
Spou. *And what is the Axe tree, & poles of this circle?*

Philoni. *The same, that are of th' Equinoctiall, & the two tropike circles. For seyng th' Equinoctiall, the ij. tropikes, & the circles Arctike, & Antarctike, be equidistant paralleles (as Proclus affirmeth) it must thẽ of necessitie folow, that they are reuolued, & turned vpon the same Poles, & haue all one Axe tree. Theodosius also confirmeth the same in these wordes.*

Εν σφάιρα, ὁι παράλληλοι κύκλοι περὶ τοὺς ἀυτοὺς πόλους εἰσίν.
In Sphæra, paralleli circuli circa eosdem polos sunt. — *Li. 2. Theor. 1*
In à Sphere the parallele or equidistant Circles, haue all one Pole.

But I will not burden you (& especillye in à trewe cause) whiche suche graue authoritie, but giue you

the figure of these.vj.last Circles, & then procede further herein. In this figure is set all the.v.Paralleles, the ij.Colures, & the Zodiake. And first B.D. is the Equinoctiall. E.F. the tropike of Cancer. H.G. the tropike of Capricorne. K.M. the Circle Arctike, & L. I. the circle Antarticke, A.B.C.D. the Solstitial colure, A.N.C. O. th' Equinoctial colure, E.G. the Zodiake, & A.C. the Axe tree, which goeth thorow the Center of th' Earth directly, & endeth at the Poles.



Spoud. *I must confesse the wordes of Theodosius, & Proclus, to be trew: but yet musinge with my selfe, I can not conceiue by what reason this Axe tre should stey the Earth. And it standyng fixed, the heauens as well vnder it, as also aboue th' Earth, should be turned, & reuolued in like maner, as we see: & I euer feare lest th' Earth, beynge so heauie, & ponderous, as it is, should fall to the other part of the Heauens, which is vnder it.*

Philo. *I perceiue you are not yet free from the fond imaginations of the grosse witted people, but yet you are the more to be excused, seyng Lactantius beynge so learned à man, was so folishe (whether it sprong of petulancye, or ignoraunce, I knowe not) as to affirme the Heauens to be flat, & not to go vnder th' Earth.*

Lactantius petulancie.

But

But now to your doubt, I answere: if God by his wõderfull prouidence, & power, did not steye it in the place where it is, there could be no axe tree whiche mighte susteine so vnknowen à burthen, & weighte: & therefore you must rather imagine à streight line, to be the forsaid axe tree, (as also the Circles of which we haue intreatid, beyng voide of Latitude, and Profunditie) then to beleue any such circles, or yet axe tree to be in the Heauẽs visiblie:

Spoud. *I perceiue your meaning right well.*

Philoni.. *Nowe you haue learned what the vj. great circles of the Sphere ar, as the Horizõt, the Meridian, th' Equinoctiall, the zodiake, th' Equinoctiall, & the solsticiall Colures: as also the iiij. lesser Circles, which are the tropicke of Cancer, the tropick of Capricorne, the circle Articke, and the circle Antarticke.*

Why sum Circles are called greater, and some lesser.

Spoud. *I haue so, I thank you sir. But for what cause be the vj. called the greater Circles, & the iiij. the lesser?*

Philo. *Iohn de Sacro Bosco, doeth answere your question in these, or like wordes. We call that à greater Circle of a Sphere (saith he) which beyng drawen in the cõpasse of the Sphere vpon his Center, do diuide it into two equall portions: & that a lesser Circle, whiche beynge drawen as th' other, do not diuide the Sphere into equall partes, but inequall portiõs, such ar the iiij. lesser Circles.*

Spou. *If I shall for the better vnderstanding such thinges as herto are spoken, make a Sphere of Hopes, & aplie your preceptes to the instrumẽt, by what order maye I gather the trew proportiõ of one of them, to an other?*

Philo. *Becauſe the tyme doth ſo faſte rõne, & I haue alſo other matters to intreate on: I wyll reſerue the making of the Sphere, vntyll I ſhewe you the cõpoſition of other inſtrumentes required in this Art, in my Organographie. But nowe for this preſent, let this figure (repreſentyng the forme of the Sphere, with all the principall Circles to it belõging) ſatisfie thine expectation.*

Th'other part of the diuiſion of the worlde.

Spoud. *Then will it pleaſe you to take in hande the ſecõde part of your diuiſion of the worlde, for hitherto (if I be not diſceiued) ſtretcheth the declaratiõ of the heauenlye Region.*

Piloni. *Trewe it is, for oure talke as yet either was of this regiõ, or els of thynges giuynge lyghte to the ſame: and now let vs conuerte oure ſtyle in like maner vnto th'Elemẽtary Region. This in it ſelfe, cõteineth the iiij. Elementes, Fyre, Aëre, Water, & Earth, (theſe are not corruptible) alſo whatſoeuer is cõteined within the circuit of the heauen of the Mone, as well bodies perfite, as alſo imperfite, made of the forſaide Elementes*

Elementes (the Latinistis call them) corpora mixta.

Spoud. *And wherfore are ther but iiij. Elementes?*

Why ther can be but iiij. Elementes.

Philo. *Aristotle doeth giue à sufficient reason: saying, there are so many Elementes as ther is combination, & mixture, of the simple and first qualities, which can be but foure: hoot, and drie, propre to the Fire: hoote and moiste, of th' Aëre: coulde and moist, which is resembled to the water: & could with drynes, to th' Earth. As for heate and couldnes, are so repugnaunt that ther can be no mixture of them: no more then of moisture & drynes. There is also an other reason made of Aristotle, taken of the diuersitie of motion, whiche I do at this time wyllingly ouer passe.*

Lib.2.de generatione.

Lib. primo de Cœlo.

Spou. *We are agreed of the number of th' Elementes, but what is theyr order, whiche of them is higher, and which of them lower?*

Philo. *That Element is higher then the rest, which is lyghtest, most fugitiue, and subtile. For it is a generall maior among Philosophers, that al light thynges cõtend vpwarde: & all grosse and põderous, to the Center of the Earth.*

A generall maior.

Spou. *By this propositiõ I gather, that the Fyre beyng more subtyl than th' other thre, shal ascend aboue them, & be next the Globe of the Mone. For you said, that ther may be no place emptie, & void. And then next him the Aëre, then the Water, & laste of all th' Earth.*

The situation & place of th' Elementes.

Philo. *It is in like order as you haue said. And the Fire, conteyneth in him the Aëre: Th' Aëre, in his compasse the Water: & the Water also doth cõpase & inuirone*

The Earth, not rounde about as th'other do, but in diuers parts, ſo that the water, & th'earth, rather make one vnifourme Globe: as this Figure here annexid doth plainely declare.

Spoud. *Ther ſemeth in your deſcription to be fiue diſtincte Regions, How may that be, ſeyng that ther are but iiij. Elemẽtes?*

Philo. *Ther are as you haue ſaide, but the Aërie Regiõ, is deuidid into iij. parts, ſpringing thorow Heate, and Colde: as the hier part of the Aëre ſignified with A. being nere to the Orbe of the Fier, and is daylie caried about, (as Cometes and blaſing Sterres ther ingendred, do apparantly declare.) and is made more hoote thẽ the middle Regiõ is: againe, the lower region next vs, markid with C. is thorowe the reflextiõ of the Sonne beames rebounding from th'earth alſo made hoote, therfore the middle region B. beynge voide of heate, is alway coulde: yea and ſo much the coulder, howe muche the heate is more vehement in th'other two regions.*

Th' Aere deuidid into thre Regions.

Where Cometes and blaſing Sterres are ingendred.

Where Haile and Snow is ingendred.

Spou. *Then in this middle region I ſuppoſe all Haile, Snow, and ſuche like is ingendrid.*

Phil. *It is ſo, but I let that paſſe, and intreate of th'uſe of*

of them, touching our first meanyng.

Spoud. *Because the Fire, and Aëre, should seme litell to profit in this place, wil you somwhat speake of the Water, and Earth?*

Philo. *I will speake nothing of the Water (but referre it vntil we intreat of Nauigatiõ) but only in this place, make mention of th' earth, and so depart vntill to morow.*

Spou. *And it weare not more for troblynge you, then any werines that I haue, I would wishe the day to be. x. daies in length, I haue receiued suche pleasure in youre instructions. But sence the Sonne sumwhat declineth to the weste Ocian, I will giue diligent eare vnto your wordes, for the short time ther is yet remaining.*

Phil. *I reioyse much to vnderstand your feruent desire to knowledge, which I will to my vttermost furder. And now touching th' Earth, consider you that she is loweste of all Elementes: blacke, ponderous, and round, inuironid, and inclosed within th' other thre. She is called the mother of fruites, the roote of all plantes, the norishe of lyuing creatures, the foundation of all buildinges, the sepulchre of the dead, the Center of the beautifull frame of the world, the matter and substaunce of mans body, and the receptakle of heauenly influence. She is also garnished with fragrãt flowres, of Man, Beast, and Foule, inhabited, and comfortablie quickened by the norishing beames of the Sõne, Mone, Planetes, and fixed Sterres. But you shall note for all that here is spoken, that there is great controuersie touching th' Earthes fourme: which must be descidid and put away, or we can safely procede*

What th' Erth is.

Diuersitie of opinions touching th' Erth his fourme.

further. As th'opinions of those which affirme th'Earth not to be rounde, like à Globe or Boule. Those that affirme it to be of pyller forme. Those that will not haue it to be the Center of the heauen. Those that suppose the Earth to moue: with other like. But the greatest of all, is the errour of those that speake againste the roundnes of th'Earth. Wherfore I will touche it principallye, whiche thing done, th'other are manifest of them selues.

Spoud. *You enter into that question, in whiche of all other I desire moste especiallie to be satisfied, for I also am in that errour (if it be an errour to say th'earth is not rounde.)* Philo. *Bring forth suche reasons than, as inforseth you so to iudge, and I will answere them.*

An obiection, against the round fourme of th'Earth.

Spou. *It semeth sufficient to credit th'Earth not to be round, if we consider the greate deepe valleis, that are in it: the Cities, Towres, Castels, and Trees, with suche like placed vpon the face of the Earth: but moste of all, the hougie and hie Mountaines, and Hilles: Of whiche, some of them are supposed to be 60. miles in height. As the Hille in th'Iland Teneriffa, (whiche Ptolomæus nameth one of the fortunate Ilandes) and is beyonde Hercules Pillers. Also an other in Thessalia, called (of Solinus) Olimpus,* beyng of suche height that the ashes (ther daies of Sacrifice beynge ended) remaine à whole yeare in the toppe of the same, not moued with troublous tẽpestes, or vehement blasles: but thorow his great height, is free from all violence of windes. What shall I speake of the Hill Caucasus, which diuideth Albania & Colchis, from Sermatia (as doth appeare*

These Hilles are the greatest in all the Earth.

**This is the famous Hill of which Poëtes so muche intreate: in the top of whiche the Gentils builded an aultar making to Iuppiter Sacrifice.*

peare in the seconde Table of Asia, in Ptolomæus Geographie) which Aristotle doth esteme to be of such hight, that it may be sene at the mouth of the riuer mæotis. The distaunce of which, is from the forsaid Hill. 620. English miles. Moreouer you shall see no place, but either flat, or els full of Hylles, Dales, Valeis, or suche like, whiche is farre from à Globe forme, & figure.

Phil. Yet do all these wordes nothing cõclude. Do you not cõsider, that the sight is deceiued in thinges from it, farre distaunt. And therfore I will in fewe wordes answere you, that these Hilles, Mountaines, & Vallies, are no more in quantitie (respect beyng had to the whole Earth,) thẽ the Pittes & holes of à rough polished Gũstone, to the stone: whiche although it be not smoth, yet it argueth nothing lesse then this gunstone not to be roũde, & like a Globe in fourme: yea, & then the bodye of the Earth beyng a rough stone, harde, & not so apt to be polished, as the body of the Water, doth remaine with such vallies & Hilles as you haue saide, & in manye places these vallies ar filled with water, to the more apt proportiõ of à Globe. Moreouer, Nature cõsidering the necessitie of th'inhabitauntes in this Center, left suche fourme vnto it as might for ther vse most cõueniently serue.

Th' answere to the first obiection.

Th'earth is a stone.

Spou. For what cause suppose you th'Earth to be à stone?

Philo. If it were not à stone but Sande, or Clay in substaunce, then the water being mixt with it, they both should be cõfounded in them selues: yea & the hie Hilles, & Moũtaines, (of which you made mentiõ) shoulde sinke, & settle downe to the Center of th'Earth

th' Earth: seynge, they are so ponderous, & heauie, & not be sustained, & borne vp as they are in the face of th' Earth. But for the further cõfirminge you in that, which is spoken, aunswere me. Imagine there were à great rounde trunke of Timber, which went thorow the whole Earth directly by the Center, & then there were à great heauie stone put in at this Trũke: how farre suppose you this stone should descende?

Spoud. *Vntill the center of th' Earth, & myddes of the Trunke.* Philo. *In like case, if th' earth were not an hard, & stonie substaunce, but Clay or Sãde (as to our sightes doth appeare) these Hilles, & rockes beyng much heauier then any stone, should in like sort go to the Ceter of th' earth. But haue you any other doubtes?*

The 2. obiectiõ Spou. *Yea verely, & that is, th' Earth to be flat.*

Philo. *What prouoketh you so to iudge?*

Spou. *This reason, that th' Earth must be in forme most agreable to the Heauens. And that the Heauẽs be flat, I can proue by th' authoritie of Lactantius Firmianus.*

Th' answere. Philoni. *It is truely said, that knowledge hath no enemie but ignoraunce. There are nowe at these daies, no small numbre of Lactantius sort, not scrupulous enemies onely, but also Physicians, of whome I am ashamed to speake, & they do contempne that knowledge (whiche is the greatest & suerist token of Gods prouidence for mankind) either by peruerse interpreting the scripture, or els of mere follie, dispising that, of whiche they neuer tasted, & are vtterly ignorant in. But such wer very ill to be Iudges, for they would condemne the man, or they*

knew

knew the crime of whiche he were accuſed: but let that paſſe. As touchyng your opinion, that th'Earth is flat, I will proue it to be rounde from th'Eaſt to the Weſt: and in like maner, from the North, to the South.

Spou. *Then muſt I nedes graũt that it is in like ſorte rounde in all partes.*

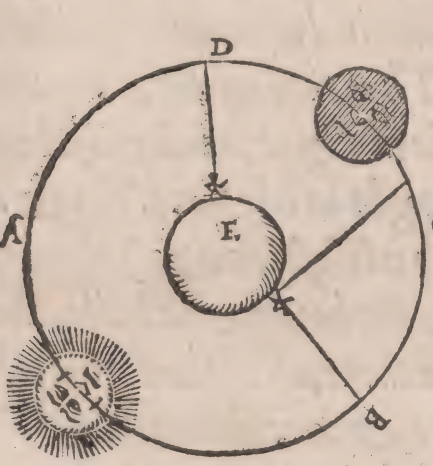
Philon. *I wyll vſe the ſame argumẽtes that Cleomedes doeth. If th'Earth were flat, then the ſterres ſhould riſe at the ſame moment to vs, that they do to them whiche dwell in th'Eaſt parts of the world: & it ſhould be mid-day with vs, & them at one inſtaunt: yea & the ſame Starres ſhould ſet in the Weaſt in lyke maner with thẽ, and vs.* *In lib.1. de Mundo.*

Spoud. *That they do not, I am moſt ſure: for at Alexãdria, à citie in Egipt, it is day iij. houres ſooner then with vs: & night in like ſorte. Yea & at Compoſtell in Spaine (which is Weſt from vs) the daye begynneth with vs ſooner by one houre & a halfe, then with them: and is daye with them, after the Sonne is ſet with vs, in like ſort one houre, & xxx. minutes.*

Philo. *And all this cometh, becauſe th'Earth is round, cauſing vs & them not to haue one generall Horizont. The like reaſon is to be ſaid of the diuerſities of times, in the beginning of an Eclipſe, either of Sonne, or Mone. As for exãple, th'Eclipſe of the Mone, which was 1556. the 17. day of Nouẽber, at one of the clocke in the morning, with vs at Norwiche, (& for the moſte parte of Englande) which in the Horizont of Calicut, began at vij. of the clock. In like ſort, ther ſhall happẽ an Eclipſe of the Mone, in the yeare of Chriſt our ſauior. 1562. the 16. day*

Example of ij. Eclipſes of the Moone.

16. daye of July, at two of the clocke, iiij. minutes in the morning: at which time she shalbe totallie darkened, & continew from the beginning to th' ende iij. houres, and yet th' inhabitauntes at Calicut, shall not see anye parte therof: whiche moste euidently sheweth the roundnes of th' Earth to be the cause, as this Figure here folowing do more plainely set out: in which, E. signifieth th' Earth: A. the East: C. the West: D. the verticall pointe for Norwich: & B. in like maner, the Zenit of Calicut. Wherby it is manifest that the Mone shalbe perfitly seperated from the Sonne, or she shall appeare in the Horizõt of Calicut. And yet we in England, & diuers other places East, shall se bothe beginning, & ende of her Eclypsing.



Spoud. These are sufficiẽt probatiõs to declare th' Earth roũd, frõ th' East to the West: but by what argument can you shewe it to be also rounde from the South to the North?

Philo. That is very easie to proue. For if th' Earth were flat from the South, to the North, then we should se the south Sterres vnder th' Earth: as well as those that be North alway in our sight. And againe, the Sonne, Mone, & Sterres, at midde day through the vniuersal yere, should be euer in one height: which also is false.

Spoud. Yea, for I haue had practise of that thinge,

saying

B1Y2.

saylinge in à shippe, for we goynge from th' Equinoctiall Line northwarde, did see the North, & south Poles, equall with the Water. But directing our course more to the north coast, & leauing th' Equinoctial, we reared the north starre in short space .xij. degr. & at lẽgth, 30. deg. & loking south, we could not se the southe Pole, nor yet many other sterres which in th' Equinoctial, were visible to vs. Phi. *Yea, & wher your north starre was eleuated xxx. degrees, your south Pole was xxx. degrees depressed in like maner: But for the firmer fixynge it in your memory, behould this Figure: in the which C. signifieth both th' Earth, and water, A. the north Pole, & B. the south, therefore if one go from B. to A (the earth being roũd) he must haue B. so muche vnder him, as A is aboue his Horizõt. There are besides these many, & sũdry reasons, to proue this thing: which I may omit (as I suppose) to you, which nede no lenger probatiõ, in that whiche is most manifest.* Spo. *Yet theis argumẽts shall not onely stay my mind in à trueth, but also with the same I shal cõfuteth' errors of other, if any shal spring about this matter.* Phil. *Then I wyll exhort you, wher these shall not seme sufficient, you will gather more & stronger out of Ptolomæus Almegiste, Cleomedes de mundo, Philo de mundo, Aristotle, Erasmus Reignholt, Orontius,*

Ptolomæus. Cleomedes. Philo. Aristotle. E. Reignholt. Orontius.

PRIMVM MOBILE
CRISTALLINE
FIRMAMENT
FIER
AER
YEARTH
WATER
CŒLIFER ATLAS
Hic canet errantẽ Lunam, Soliſq; labores
Arcturũq;, pluuiaſq; hyad. gẽinoſq; triões
ID.

John

Iohn de Sacrobosco, & oure countreyman master Recorde, which doeth almost repete all their argumentes, in the Castell of knowledge. And nowe behold the Type of the world, conteinyng in it, as well the heauenly Regiõ, with suche Spheres, & Circles, as haue bene in sundry partes before set forth in this treatise: as also th' Elementarie region, comprehendyng the Fier, Aëre, Water, & Earth: in suche order & forme, as is cõsonant & agreyng both with Reason, Practise, and Authoritie of most approued authors. And for this time we will depart: for beholde the Sonne is gone to rest, & Hesperus do shewe in the West verie brighte, all other liuynge thinges also do apply them to take rest: therfore let vs go downe this Hill into the Citie, refreshyng our selues, & quickening memorie, & to morow I wil mete you in this same place agayne.

Spoud. *I thanke you hertly.* Philoni. *Let me here & you can repete the summe of such thinges, as we haue taken in hande this day, as we walke downeward.*

Spoud. *With à right good wyll.*

1 *First, you shewed me what Cosmographie was, what Geographie, and what Chorographie, yea, and wherein euery of them differeth from other.*

2 *Next, what the world was, with his partes (that is to saye) the Heauenly Region, & Elementary: with à briefe Discourse, touchinge the Partes, and order of the Heauenly Region.*

3 *Thyrdly, what a Sphere is, howe it is deuided into a Right, and Croked Sphere: And howe it differeth from a Cirle.*

4 *Forthly, what a Center was, what an Axe tree, what a Diameter, and of theyr difference.*

5 *Fiftlye, of the Principall Circles whiche are saide to be in this Sphere. As the Horizont, Meridian, Æquinoctiall, Zodiake, two Colures, the two Tropickes, the Circles Arcticke, and Antarctick. Also that the Horizont, and Meridian Circles be stable, and without motiõ, with diuers other thinges herto belonging.*

6 *Last, you proceded to the second part of the world, which is th'Elementarie Region: In which you refuted sundry opinions, touching the forme of th'Earth.*

Philo. *Nowe I perceiue bothe your apte nature in conceiuing such thinges as are spoken, & also your firme memory in reteining the same. Wherefore you shall encourage me, to geue you further instructions. But for this time I must bid you fare well.* Spou. *God preserue you, & graunt you life to accomplishe your desire, in profiting your countrey, as you do entende.*

Amen.

THE SECONDE BOOKE OF

the Cosmographicall Glasse: in which is plainly expressed the Order, and Number, of Zones, Paralleles, and Climates. Also sundry waies for th' exacte findyng out of the Meridiane Line: The Longitude, & Latitude, of places: with many other preceptes, belongyng to the making of a Carte, or Mappe.

Spoudæus.

MORPHEVS THE God of dreames, with his slepie rodde, so much this last night frequented my companie, that (my bodye taking rest) my mind was much more busilie traueling in such conclusions as I had learnid of Philonicus, thē it was in the time of his teaching. For some time Morphêus shewed me the Sonne, in the tropicke of Capricorne, farre in the South, among the cloudye skies, as he comenly is the. 13. day of December: And next he appered in th' Equinoctiall pointes, as it is the tenth daye of March, and the. 14. of Septēb. willing me with great diligēs to note that parallele circle. Shortly after the sone appeared in the tropicke of Cancer, in whiche place he is the. 12. daye of Iune, causing in our region the lōgest day in the yere. & imediatly the time semed as it were midnight, & Charles Wayne, with Bootes, & diuers other sterres, turned about the Pole. But as he wold haue caried me about the heauēs, to haue shewid me the North

Whā the Sōne is in the Tropick of Capricorne.

In both Æquinoctiall pointes.

In the Tropick of Cancer.

Crowne, stronge Hercules, Cassiopeia, th' Egle, the flieng Horse, mightie Orion, the two Dogges, & the famous, & great shippe Argo. &c. Mercury the messenger of the Godes came to my bedde side, & saide, Aurora did appeare, & Phebus with his goldē beames, was entred his chariot, minding to finishe his diurnall Arcke: so that it was à reproche for me, any lōger to play the sluggard: declaringe more ouer that Philonicus was in the fildes. And surely I suppose no lesse, but I shall not from him be longe absent. I am iustly reprehended of Mercury, because the time that is cōsumed with slepe more then nature requireth, is all lost: for ther spring no profit therof, but sicknes & disquietnes, both of body & minde. But what is he that calleth Spoudæus, & beckneth with his hand? It is Philonicus. I will make spede to mete him.

Philon. *God saue you Spoudæus.*

Spoud. *And you also, moste hertilie I require the Gods: you know th' occasiō (I trust) of my resorting into this place.* Philo. *For to be further instructed in the knowledge of Cosmographie.*

what is taught in this seconde Booke.

Spoud. *It is verely my desire, & specially to know the Longitude, Latitude, & circuit of th' Earth, and of the diuisiō of it into Climates, to know the meanyng of Zones, & paralleles: to finde out the Meridiane line, the longitude & latitude of any place: because they haue à singuler vse in this Arte.*

Philo. *You haue repeted matter ynough to cōsume this day in, & I wyll if tyme permitte, willingly satisfie your requeste. But seynge this thinge doeth depende chiefly of dimen-*

dimention, & measuringe: it is requisite to knowe that first, yea & the principall partes of it.

Spou. *Dimention is no other thing, then à lõgitude knowen, & practised: by which we maye in like maner, measure th' vnknowẽ distaunce of places by the same experience.* Philo. *Trew it is. And there are thre thinges only which may be measured. For either it is ã line, as Longitude: or els à Plat forme, as Latitude: or last, à body, as thicknes, or profunditie.*

What Dimẽtion is.

Spoud. *Glarianus hath the like saying, & Campanus sheweth wherof these three do spring, in this maner. A point (saith he) is that which haue no partes, yet by the mouyng of it, à lyne is described. And a lyne, moued because it hath length (beynge voide of breadth & depenes) cã but describe a plat forme. This plat forme, is both a rounde plat forme, & also a flatte, as in these figures. And a plat forme moued, because it hathe lẽgth & breadth, describeth a Body, hauing both length, breadth, & depenes.* Philo. *Hereto agreeth youre Pathway. Now proced we further. Because in this Arte, the chiefe measures we vse, is a Pase, a Forlõg, a lequè,*

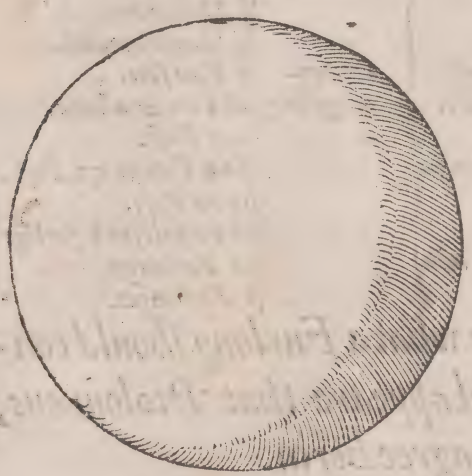
What a Point is.

What a Lyne is.

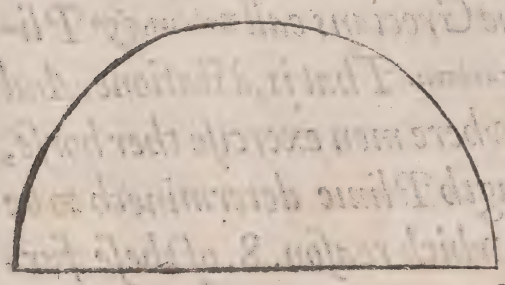
What a Plat fourme is.

What a Body is.

A rounde plat forme.



A plaine plat forme.



a Mile, a Degree &c. I will set before your eyes in this Table both the diuersitie of miles, & also their exacte length, placing a Barly corne (being the least measure) as the rule, wherby other measures shalbe tried. And like as progression is made from the least vnto the moste, as from a point, to a lyne: from a lyne, to a plat forme: and from a plat forme, to a body: euen so in the quantitie of measures, we do go frō a barly corne, to a finger breadth: from a finger breadth, to an vnch: frō an vnch, to an hād breadth: from an hand breadth, to a spanne: frō a spāne, to a fote: from a fote, to a pase: & so forth to a pearch, a furlong, a lequè, a mile, as in this Table is manifest and playne.

A Barly corne is the least measure, yet from it do all other measures procede, as	*A Finger breadth,*	4 *Barly cornes in thick*
	An Vnche.	3 *Fingers.* (*net.*
	A Hande breadth.	4 *Fingers.*
	A Spanne.	3 *Hande breadth.*
	A Fote.	4 *Hande breadth.*
	A Geomtricall Pase.	5 *Fiue fote.*
	An Englishe Pearche.	16 *Fote & a halfe.*
	A Furlonge.	125 *Pase.*
	An Englishe Furlonge.	660 *Fote, or* 132. *Pase.*
	A Leque.	1500 *Pase.*
	An Italian mile.	1000 *pase, or* 8. *furlōgs*
	A comon Germaine mile	32 *Furlonges.*
	An Englishe mile.	8 *Furlonges.*

Conteyninge in it.

There is also diuersitie what a Furlong should conteine in length, & it should appeare that Ptolomæus, Strabo, & Plinius, do not agree herin.

Lib.2.cap.23. Natura. hist.

Spou. *What call you this worde Furlong?*

Philon. *That which the Grecians call* Στάδιον, *& Plinie name it Stadium* ἀπὸ τῆς στάσεως. *That is, à Statione. And it is vsurped, for a place where men exercise ther horse, ronnyng a rase, which length Plinie determineth to be* 125. *pases, or.* 625. *fote, by which reason.* 8. *of these furlonges*

longes do make an Italian or Englishe mile, which beyng multiplied by 4. makes. 32. furlonges, the length of a comon Germanie mile, I call it à common Germaine mile, for that in Heluetia not obseruing any true distãce in theyr iorneis, they vse 40. or. 50. furlõges for a mile. Heluetian miles.

Spou. *Those are Robin Hodes miles as the prouerbe is.*

Phi. *There is also a diuers order in measure obserued, as th' Ægiptians by signes: the Gretians by furlonges: the Spaniardes, & French men by leques: the Italiãs, Germaines, & Englishmen, by miles: which I thought mete to declare, more for that it may further you in reading theyr workes, then that I entende to introduce in place any of ther waies, but wil vse only th' English mile, writing to Englishe men: the quantitie wherof as I said, is 8. furlonges: euery furlonge conteining 132. pases: euery pase 5. fote: euery fote, 4. handbreadthes: euery hand breadth, 4. fingers in thicknes: euery finger, 4. Barly cornes rounde & dried. So that an Englishe mile conteineth in length. 253440. Barly cornes, as by the rules of Arithmetike, is manifest & plaine.* The quantitie of an Englishe mile.

Spoud. *This semeth very straunge, yea rather incredible, yet surely to be trew, I am assured.*

Philon.. *You shall vnderstande matters, both more straunge, & pleasaunt then this, which is founde out by th' infalible rules of Arithmetik, & Geometrie: & now procede we to our purpose, beginning with this word Lõgitude.* Spoud. *I take it for no other thinge then the distaunce of à Starre, or part of à signe, from the beginning of Aries the first signe, in the Zodiake. As the* ...rcuit ...n Earth.

Virginel.

Virgines ſpike, in the xvij.degree. xlij. minutes of Libra: is vj.ſignes, xvij.degrees, & xlij.minu. or 197. degrees. xlij.minu. from the head of Aries.

Longitude taken two waies

Philo. *That ſignification of Lõgitude, is vſed among th' Aſtronomers: but in Coſmographie it is otherwiſe. For they call the Longitude of any Region, the portion of th' Equinoctiall Circle, which is included betwixte the Canarian Ilandes, (in the Weſt beyng the firſt degre of Longitude) & the Meridiane of the Regiõ, that thou wilt deſcribe. Such portiõ of th' Equinoctiall in the middes of Englande (from the fornamed Ilandes) is about xxij.degrees.* Spoud. *Then in deſcribinge the face of th' Earth, Coſmographers do place the firſt degre of Lõgitude in the Weſt fortunate Ilandes, & ſo proced thorow the whole face of the ſame, vntill they come to that place agayne.* Philo. *It is ſo as you ſay. So that the myddes of th' Earth is 180.degrees, from the Weſt. Such are th' Eaſt Indians, & 360. is the furdeſt that one can be from the Weſt.* Spou. *But could not the degrees of Longitude be accompted from ſome other parte of th' Earth, as well as from th' Iandes afore ſaid?*

Ptolomæus.

Philo. *Yes verely: but Ptolomæus the reſtorer of this Art, placed the firſt degree of Longitude in them, as the furdeſt point of the confines & boundes of Afrike, & Europe: as the famous, & excellent pillers of Hercules (called of Diodorus (alpe, & Abyle) doth declare. The cauſe which moued Ptolomæus thus to do, you ſhal finde in his Geographie.* Spoud. *And is ther the like difference, betwixt Coſmographers & Aſtronomers cõcerninge*

Hercules Pillers.

...logo li. ...hiæ I.

cerning the ſignification of the Latitude of à region, as ther was in the Longitude?

Philo. *No verely: For they meane nothing els by the Latitude of à region, but th' Arke, or portion of the Meridiane circle, conteined betwixt the Pole of the world, & the Horizont of the ſame region.* *What Latitud is.*

Spou. *And is not this Latitude, reconed frõ th' Equinoctiall vnto either of the Poles?*

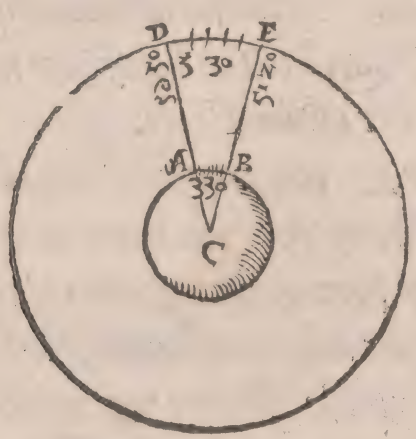
Philo. *It is, as in like maner the Longitude, from the Weſt to th' Eaſt.* Spoud. *Yet Glarianus accõpteth the Latitude from the North to the South, & not from th' Equator towarde either of the Poles.* *Glarianus errour.*

Philon. *It is à ſmall errour, & you your ſelfe are able to refute it. But nowe will I ſhewe vnto you howe muche the circuite of th' Earth is, & then make mention of the Zones.* Spou. *Sir, neuer take it in hande, for the comon people will iudge you madde: ſeynge you neither haue gone about the viij. parte of it, neither yet for want of yeres you might acheue ſuch an enterpriſe, although you had ſo long life giuen you, as Neſtor had, becauſe of the hougie Seas, greate Riuers, & depe Lakes, beſides Wodes, Rockes, deſerte places, & innumerable perils: which I can not repete.* Philon. *You haue trewly ſayd, if ther were none other way to atteine to it, thẽ by traueling about it: but it ſhalbe ſufficient to haue traueled any portiõ of this great circuit. For Ptolomæus ſheweth how to find out the Circuit of th' Earth, by ſearching the diſtaunce of à great Circle, cõprehended betwixt the vertical points of two (or more) places, diſtaũt à ſunder.* *Howe to finde out the Circuit of th' Earth.*

Spoud.

Spoud. By what meane shall I finde out the vertical point*? Phi. It is equall to the Pole Arctike (the finding of whiche, hereafter I will teache you) & you maye vse th'one for th'other: thẽ you also in like maner must know the distaunce in miles of these places, after diuid the distaunce of the two places, by the differẽce of the two verticall pointes, & the quotiẽt shall shew you howe manye miles do answere to one degree of the saide Circle in the Heauẽs. But or we further proced, marke this figure, in which C. is th'earth, A.B. the distaunce of two placis in th'Earth, D. E. the space of the greate Circle in Heauen, betwixte the two verticall pointes.

*The verticall Poynte, Zenit or Pole of the Horizont, is so much distante from the Equinoctiall, how much the Pole is eleuated aboue the Horizõt. And like as the meridian, euer do describe the Northe and Southe costes: so dothe the verticall Parallele, the East and West.



Now diuiding the space, A.B. by D.E. the quotiẽt shal shew the nũber of miles. As for exãple: I take th'eleuatiõ of the pole at Portsmouth, whiche is the furdest place on the south shore of Englande, & finde it, 51. degr. 20. minutes: & in like sort at Barwike, the furdest place North, whose Latitud is 56. deg. 50. mi. The differẽce of these. 2. eleuatiõs is. 5. degrees, 30. minutes. Also the directe distaũce from Portsmouth to Barwicke, is 330. miles. Therefore diuiding the. 330. miles (which is the portiõ of th'Earth, answering the differẽce of these 2. Eleuatiõs) by the 5. degrees, & 30. minutes, which is the difference: I find the

An example.

quotient

quotient to be. 60. Wherefore in all places in Englande 60. miles, answer to one degre of any great Circle in the heauen. Spoud. *Then I pray you retorne to your figure againe, and conferre it with your example.*

Philo. *I wil so do. First. A. do represent Barwike. B in like maner Portsmouth, whose eleuations of the pole Arcticke is set ouer their heades. The distance frō. A. to. B. 330. miles, the portion of the heauen betwixte the ij. eleuations is. 5. degrees. 30. minuts: by which I did deuide the distance of th' Earth. A. B. findinge the quotient. 60. And in like sorte you may worke with anye other places in th' Earth.*

Spoud. *This serueth well for to knowe what portion of th' Earthe in Englande, answereth to th' Arke of anye greate Circle conteined betwixt the Zenit of two seuerall places. But what is thys in respect of the Circuit & compasse of the hole Earth?*

Philo. *Yet by this you are able to declare how manye miles answer to. 30. degrees?*

Spou. *Yea verely, and that easely.* Philo. *And by the same ordre you may find that. 21600. English miles, answere vnto. 360. degrees whyche is the compasse of the heauēs.* Spou. *This is so euident that all men must nedes cōfesse it, but it semeth very meruailus.* Ph. *What say you then (which is more) if I make you presentlye to find how many barly cornes in thicknes wil go about the Horizont, if thei might be placed equally?* Spo. *It semeth impossible to be brought to passe by any mans deuise, & therfore you had best omit the worke.*

Phi. *You know how many barly cornes will extend the lẽgth of an Englisſh mile?* Spo. *Yes ſir, you ſaid.*253440. *maketh a mile in length.* Phi. *Thẽ if.*253440. *cornes make à mile: ſhall not* 5474304000. *barly cornes anſwer to.*21600 *miles?* Spo. *And is there any difference towchig the cõpaſſe of th'earth?* Ph. *Yes for Ptolo. ſaith* 22500. *mil. the circuit of th'earth. Tibitius & Alphraganus but.*20400. *Eratoſthenes.*31250. *& Hipparchus* 34625. Spo. *And you differ frõ thẽ all: but wherof doth all this diuerſitie ſpring?* Phi. *Ether of the diuerſitie of the meaſures, or els that the places Latitudes wer not exactly knowẽ. As Ptolom. making example of Alexãdria & Rodia, càlleth Rodia* 36. *deg. &* 50. *mi: Wher it is* 38 *degr. &* .30. *min. now behold the Figure.*

Diuerſitie of opinions touching th'earth his circuit.

And seyng you haue learned sufficiently what the Lõgitude, Latitude, Circuit, or Compasse of th' Earth is: it should seme very requisite to make playne relatiõ, which places of th' Earth are habitable, & which be not.

Spoud. *That thing is very expedient aswel, for the conseruation, as also reperation, & restoring a man vnto health lost. For by that inuention the temperature of th' Aëre, is easely founde out.*

Phil. *You haue well spoken, & therfore we wyll conuerte our talke vnto the zones.*

Spou. *It should seme first requisite to declare the nature of Paralleles, for by the distinction of them (as I remẽber) the Zones are founde out.* Philo. *It is so, but here note that there are Paralleles which diuideth the Longitude of Regions, & are called Paralleles of Longitude, & also Paralleles of Climates (which in there place I will declare) makinge here mention but of v. onely, which haue principall vse in the distinctiõ of zones. As th' equinoctial, the ij. tropikes, the circles Arctike, & Antarctike. And these deuide the face of th' Earth in fiue portiõs, or partes, & are called zones, in French bẽdes, & we may aptly call thẽ equidistaunt places, or Girdles.* Spou. *And howe is th' Earth diuided into fiue Zones according to the v. parallele Circles?* Phi. *I will shewe you after Parmenides mind, vnto whõ Posidonius (as Strabo witnesseth) ascribeth th' inuentiõ. First directly vnder th' equinoctial in the heauẽs, ther is also in the mides of th' earth an Equino. imagined, & vnder the tropick in the heauẽ,*

What a Zone is.

Parmenides. Posidonius.

two tropike Circles in th' Earth: and finallye, vnder the two polary circles in the Heauen, two circles in th' Earth answering in like proportiõ: so that th' Earth is parted in v. equall portiõs, which are called zones, as this Figure doeth manifestly set out.

Spoud. *Do you not in this Figure call euery portion betwixt two paralleles: à zone?* Phil. *Yes verely, as the space betwixt the tropike of Cãcer, & Capricorn, in Græke is called* Διακεκαυμένη, *with vs the burning zone, becauſe the ſonne goeth ouer th' inhabitauntes heades cõtinually. Alſo betwixt the tropicke of Cancer, & the Circle Arctike,* Εὔκρατος. *or the temperate zone. And the portiõ betwixt the circle Arctick & the north Pole* Βόρειος *we call it Froſen. In lyke maner with th' other two zones ſouthe from th' Equinoctiall, the temperate ſouth zone is called* Αὐτεύκρατος, *and the froſen zone,* Νότιος.

The burning zone.

Temperate zones.

Froſe Zones

Spou.

Spou. *Yet by my computation your table ſheweth ſexe zones: Two froſen zones, two temperate, and two burninge zones: for the ſpace betwixte the two Tropicke Paralleles, is deuided equally of th' Equinoctiall.*

Phi. *You are in the ſame error that Polybius was (as teſtifieth Strabo) but Proclus hereto do aptly anſwer, where he ſpeke of zones, and I will repeate his wordes of this burning zone only, omitting the reſt, whereby it ſhalbe euident vnto you, that there are not two, but one burning zone, his wordes are theſe.* *Polybius error.*

Περὶ τῶν πέντε ζωνῶν.

Ἡ δὲ λοιπὴ, μέση τ προειρημένων, κειμένη δὲ ἐπ' αὐτῷ τὴν τοῦ ἡλίου πάροδον, διακεχαυμένη καλεῖται: διχοτομεῖται δ' αὐτὴ ὑπὸ τοῦ ἐν τῇ γῇ ἰσημερινοῦ κύκλου.

Reliqua quę inter memoratas quatuor medium locū tenet, quod ſub ipſo Solis tranſitu iacet, torrida nuncupatur: à tereſtri equatore in duas partes diuiſa.

Th'other zone (ſaith Proclus) which is in the mids of the .iiij. aforeſaid, becauſe it lieth vnder the courſe of the ſonne, is called burning: and is deuided of th'earthly Æquinoctiall, in two equall portions. Spoud. *But what compelled Proclus to ſaye that it is but one zone: Seinge it is deuided in two, by the aforeſaide earthlye Æquinoctiall? I wil tel you, becauſe ther is no alteratiō of the quality, & tēperature of the heauēs betwixt the ſpace and diſtance of the .ij. Tropikes, but continuallye hote al the yere (by reſō of the ſones iornay in the zodiake as in the figure you may ſe) therfore not only Proclus but alſo Plato, Ariſtotle, Strabo, Ouide ād Virgil yea & al authors do make their accōpt but of .v. zones.* *An obiection.*

Spo. *It ſhuld ſeme that this burning zone, for the feruēt heat, & the .ij. froſen zones ſo far diſtant from the ſones courſe, ſhuld not be habitable, as Ouide doth right excellently in theſe verſes ſet out.* *Lib. 1. Metamorphoſ.*

Vtq; duæ dextra cœlum, totidemq; siniſtra
Parte, ſecant zonæ: quinta eſt ardentior illis:
Sic onus incluſum numero diſtinxit eodem
Cura dei, totidemq; plagæ tellere præmuntur:
Quarum, quæ media eſt, non eſt habitabilis æſtu.
Nix tegit alta duas, totidem inter vtraſq; locauit,
Temperiemque dedit, miſta cum frigore flamma.

Like as the Zones into v. partes do right the Heauens diuide,
Euen ſo, for th' Earth à nũbre like, nature did well prouide
The middeſt of thẽ all men eſchew, the burning is ſo fell. (dwell.
In the zones next the Poles through could, no creature long maye
Betwixt theſe, & the burning Zone, two other ſe you may,
For tempratnes repleniſhed with liuinge thinges alway.

The Anſwer. Philo. *Well, bycauſe I will not haue you to erre with Poëtes, & other that ſuppoſe theſe not habitable, I will take the more diligence to driue this Hereſie out of your* Ptolomæus. Auicenna. *heade, & althoughe Ptolomæus, & Auicenna were of ſufficient authoritie, to make you credit this thing, affirminge that they haue ſene men whiche did inhabite betwixt th' Equinoctiall, & the tropike of Cancer: yea, & that, ther ar many notable Cities, & Villages: yet I wil vſe other reaſons then teſtimonies in this behalfe. And firſt anſwer me: Is not the heate of the Sõne cauſe (that in the Sũmer ceaſon he inclining toward our habitatiõ) that mens colour in ther faces & hãdes are made blacker, then naturally they are?*

Spoud. *Yes verely: & I haue ſene ſome dwellers in litle Vilages, as Plowmen, Heardmen, & Shepehards maruelouſly ſonneburnt.* Philon. *What wil you cõiecture then of thoſe people that are blacke, face, body & all externe partes of them, doeth it not come of the heate of the Sõne?* Spoud. *It muſte nedes ſo be, and I haue ſene men of that colour, & we call them*

Æthi-

Æthiopians. Philo. *Very well, & do not you beleue that the countrey where they dwell, muſt of force be vnder the beames of the Sõne?* Spou. *Els it could not folow that ther colour ſhould ſo much differ frõ ours.* Philon. *And there is no place vnder the perpendiculer Sõne beames, but only this burning Zone: & Arabia (ſumwhat frõ the Sõne beames ſituated) is the cauſe that th' inhabitauntes, are not ſo blacke as the Æthiopians: nor the Spaniardes, as th' Arabians: or Frẽchmẽ, as the Spaniardes.* Spoud. *And the Germaynes haue their ſkinne whiter then the Frenchemen: & we here in Englande, then all theſe: ſo that the furder from this burninge Zone, the whiter the ſkie: and the nerer th' Equinoctiall, the blacker, & more aduſt & burnt.* Philo. *Moreouer the Nauigatiõ to Calicute, (of which voiage Veſputius, & Columbus were the firſt authors, & nowe more frequented of the ſpanierdes, then ſayling into coũtreis nie adiacẽt to vs) do witnes beare, that vnder this burning Zone there are inhabitaũtes.* Spou. *by theſe wordes it is manifeſt, that the burning Zone is not habitable onely, but alſo inhabited. And as touchinge the temperate Zones, no man is ſo foliſhe, or madde, as to denie them to be repleniſhed with all liuing creatures abũdantly: wherfore if you can proue that the two Zones, next the Poles are alſo habitable, you ſhall as farre baniſh this errour frõ me, as the Sõne doth darkenes.* Philoni. *Although Ptolomæus do not deſcribe any parallele beyonde Thylim, whiche is two degr. & more of this ſide of the Circle Arctike. And*

Veſputius Columbus.

that for the ſituatiõ of it, farre diſtant from the beames of the ſonne, and therfore the Waters cõtinually froſen and th'Earth with Snow couered: Yet Eraſmus Reignholt (and that truley) deſcribeth a Parallele by Hielſo, an Flãd in Norway which is. 9. degrees beyonde the polary or Arctike circle. Alſo the grene lande, and in diuers countreis there inhabited, and the inhabitants are called in Greke περισκίοι in Latine Periſcij, and we may call them aptly inhabitantes which haue there ſhadowe daily declininge vnto all partes of the Horizont.

Eraſmus Reignholt.

Spo. *Then I perceiue that both the burning zone, & alſo the froſen are habitable and not that only, but alſo inhabited, although not ſo plentifullye as the temperate zone. But nowe ſence ther is offered good occaſion to intreat of ſhadowes, and their diuerſitie, yea and the place ſerueth aptly for it, or we do further procede. Wherfore I require you, to turne our cõmunicatiõ to this matter.*

Phi. *With a right willing mind. You muſt firſt vnderſtãd that of the diuerſitie of ſhadowes, ther ar. iij. diuers diſtinct habitatiõs of people found, that is to ſay,* Ἀμφίσκιοι, Ἑτερόσκιοι, Περίσκιοι. *whiche names alſo the latineſt vſe, Amphiſcij, Heteroſcij, Periſcij, & we wãt apt Engliſh termes for them, yet I will make it plain thoughe I vſe the more wordes. And firſt I wil ſpeke of thoſe which we call Amphiſcij. You do marke wel that the ſonnes courſe, & recourſe continuallie in the Zodiak maketh the ſhadow long, and ſhort?*

Amphiſcij.

Spou. *I know that well, and the nerer he cometh toward vs, the ſhorter is the ſhadow, and the furder he goeth frõ vs, the lõger he geueth a ſhadow.*

Philo.

Philo. *Jt is so as you say. But how thinke you, is ther not some place that hath no shadow?* Spoud. *There can be no such.* Philo. *Jf the greatest declination of the Sonne from th'Equinoctiall nere to the zenit, & verticall poynt, make the shadow shortest that can be in thy region: then where he goeth ouer any zenit, there muste be no shadow.* Spou. *Jt should seme to follow.*

Phil. *Yea it muste of necessitie so be.* Spoud. *But where is there any such, ouer whose heades the Sõne directly goeth?* Philo. *Suche be those that dwell in the burning Zone, which (as I said) is betwixt the two Tropikes, so that when the Sonne is in the beginning of Aries, and Libra, they haue no shadowe, and therefore Plinius calleth thẽ* Ασκιοὶ, *Ascij, or people withoute shadow. And because he is twise yerely in these poynts, thei haue two sommers, and in like case two winters, for that he declineth to the Tropikes of Cancer, and Capricorne. Wherfore Lucanus spake of such inhabitants very aptly, in this these verses following.*

Ascij hath two Somers & two Winters. lib. 9.

Libro. 9.

Deprænsum est hunc esse locum, quo circulus alti
Zolstitii, medium signorum percutit orbem.
This is the place where th'Equinoctiall diuides
The Zodiake in twaine, causinge two Somer tides.

Spoud. *Jremember that Ptolomæus in his Almegist maketh mention of such inhabitantes, and nameth also such as dwel vnder the tropikes Ascij, but yet I shuld not haue called it to mind if you had not geuẽ th'occatiõ.*

Lib. 2. cap. 4.

Philo. *Yet thys people whan as the sonne declyneth Northward from them, haue a shadow, which shadow falleth at none stede directlye southe (for of other shadowes*

dowes I make no accompte). Spoud. *Jt muſt neades ſo be, for the ſone is North frō that thing which geueth the ſhadowe.* Philon. *And whan the ſonne is in the winter poynt, vnto what coſte do the ſhadowe decline?* Spoud. *Jt ſhall fall directly North by the reaſon of you aleaged.* Philo. *Here then you ſe the cauſe wher of theſe inhabitauntes were called Amphiſcij, and we maye call them double or two folde ſhadowed.*

Heteroſcij. Spou. *J vnderſtand your meaning.* Philon. *The ſecond be thoſe, which haue the ſhadow continuallye, toward one coſte, ether North or South.* Spou. *Then we be in the numbre of thoſe, for we haue oure ſhadow directly North.*

Antipodes. Phi. *And ſuch be thoſe that dwel in th'oppoſite place of th'earth againſt vs (& therfore called Antipodes. For the ſone neuer comminge ouer their zenit, they haue the ſhadow into the South coſte perpetually declining, as we haue into the Northe.* Spou. *This muſte nedes be certainly true, but yet J do much meruaile therat.*

Phil. *What ſo euer is rare, and not commonly ſene and hard, is euer meruelous. And the Arabians commynge into Europe, meruailed as muche to ſee the ſhadowe Northwarde, as you do to here it is declined (with the aforeſaid inhabitants) toward the South coſt, & therfore Lucanus ſpeaketh of them in this ſort.*

Lib. 3.

Ignotum vobis (Arabes) veniſtis in orbem,
Vmbras mirati nemorum non iri ſiniſtras.
A Region vnknowne (Arabians) you finde:
Muſing that the ſhadow, is ſtill North declinde.

Spou.

Spou. *There remaineth yet to speke of the thirde sort of people which you named Periscij.* Phil. *They toke that name because thei (dwelling within the circles arctike & Antarctike) haue the shadow going round about the Horizont.* Spou. *But yet the shadowe moueth not so swiftlye aboute th'Earth with them, as it doeth with vs (and those you call Amphiscios) for wyth vs it goeth about from the West by the Northe, & so to the East in the space (that the sonne is in oure Hemisphere, & aboue th'earth, whiche at the most is in.xvij.houres.* Phi. *It is so.* Spou. *The seing the sonne goeth not out of ther sight for the space of.182.dais, & xij. hours, whiche is there continuall daye: then it should go aboute the horizont but in that log place.* Phi. *That is false. For how think you, doth not the sonne circuit th'earth in xxiiij.houres continuallye?* Spou. *Yes verely.* Phil. *The doth the shadow go about their Horizot in the same space of time, except you imagin those Periscios, to dwel without the circuit of th'earth.* Spo. *That were a poynt of demency or madnes: so that as ofte as he circuith th'earth, so ofte in lik case do ther shadow turne about the place of their horizont, which must neades be 182. times.* Phi. *I am glad you vnderstand the reaso of it, and now behold the table of shadowes.* Periscij.

A TABLE, OF SHADOVVES, SHEVVING THEIR PROPORTION VNTO THE GNOMON

(it beyng deuided in 60. partes) for euery degree of the Sonnes altitude: and also the quantie of the Shadow in euery Country, Region, & City, thorowe the vniuersall Earthe, whan the Sonne is in the Æquinoctiall, and Solsticiall poyntes.

The Sonnes Altitude.	The Shadow. par.	Mi	Th'eleuatio of the Pole.	Shadow Solstitial in Somer par.	Mi	Æquinoctiall Shadow par.	Mi	Shadow Solstitiall in wi. par.	Mi	The Sonnes Altitude.	The Shadow. par.	Mi	Th'eleuatio of the Pole.	Shadow Solstitial in So. par.	Mi	Æquinoctiall Shadow par.	Mi	Shadow Solstitial in wi. par.	Mi
1	3437	24	1	24	49	1	3	27	18	46	57	56	46	24	53	62	8	160	16
2	1718	10	2	23	36	2	5	28	35	47	55	57	47	26	7	64	20	169	12
3	1144	52	3	22	24	3	8	29	53	48	54	1	48	27	22	66	38	179	4
4	858	2	4	21	13	4	11	31	12	49	52	9	49	28	39	69	1	190	0
5	685	48	5	20	3	5	15	32	32	50	50	20	50	29	56	71	30	202	14
6	570	51	6	18	53	6	18	33	54	51	48	35	51	31	15	74	5	216	0
7	488	39	7	17	44	7	22	35	18	52	46	52	52	32	37	76	48	231	35
8	426	55	8	16	36	8	26	36	44	53	45	12	53	33	59	79	37	249	26
9	378	49	9	15	29	9	30	38	11	54	43	35	54	35	23	82	34	270	5
10	340	16	10	14	22	10	34	39	40	55	42	1	55	36	48	85	41	294	15
11	308	40	11	13	16	11	39	41	12	56	40	28	56	38	15	88	57	322	57
12	282	16	12	12	10	12	45	42	45	57	38	57	57	39	45	92	23	357	35
13	259	53	13	11	5	13	51	44	21	58	37	29	58	41	16	96	1	400	16
14	240	38	14	10	0	14	57	46	0	59	36	3	59	42	50	99	51	454	12
15	223	55	15	8	56	16	4	47	41	60	34	38	60	44	26	103	54	524	34
16	209	14	16	7	52	17	12	49	24	61	33	15	61	46	5	108	14	620	17
17	196	15	17	6	48	18	20	51	11	62	31	54	62	47	46	112	50	758	8
18	184	39	18	5	45	19	29	53	2	63	30	34	63	49	30	117	45	974	1
19	174	15	19	4	42	20	39	54	56	64	29	15	64	51	17	123	0	1360	36
20	164	50	20	3	38	21	50	56	53	65	27	58	65	53	8	128	39	2253	44
21	156	18	21	2	35	23	2	58	54	66	26	43	66	55	1	134	45	6547	56
22	148	30	22	1	32	24	14	61	0	67	25	28	67	56	59	141	21	Infinite	
23	141	21	23	0	29	25	28	63	10	68	24	14	68	59	1	148	30	num-	
24	134	45	24	0	33	26	43	65	25	69	23	2	69	61	6	156	18	bre.	
25	128	39	25	1	36	27	58	67	45	70	21	50	70	63	17	164	50		
26	123	0	26	2	38	29	15	70	11	71	20	39	71	65	32	174	15		
27	117	45	27	3	41	30	34	72	43	72	19	29	72	67	52	184	39		
28	112	50	28	4	44	31	54	75	21	73	18	20	73	70	18	196	15		
29	118	14	29	5	48	33	15	78	7	74	17	12	74	72	51	209	14		
30	113	54	30	6	52	34	38	81	0	75	16	4	75	75	29	223	55		
31	99	51	31	7	56	36	3	84	2	76	14	57	76	78	15	240	38		
32	96	1	32	9	0	37	20	87	13	77	13	51	77	81	9	259	53		
33	92	23	33	10	4	38	57	90	34	78	12	45	78	84	11	282	16		
34	88	57	34	11	8	40	28	94	5	79	11	39	79	87	23	308	40		
35	85	41	35	12	14	42	1	97	49	80	10	34	80	90	44	340	16		
36	82	34	36	13	19	43	35	101	45	81	9	30	81	94	16	378	49		
37	79	37	37	14	25	45	12	105	56	82	8	26	82	98	0	426	55		
38	76	48	38	15	32	46	52	110	23	83	7	22	83	101	58	488	39		
39	74	5	39	16	40	48	35	115	8	84	6	18	84	106	9	570	51		
40	71	30	40	17	48	50	20	120	11	85	5	15	85	110	37	685	48		
41	69	1	41	18	57	52	9	125	39	86	4	11	86	115	23	858	2		
42	66	38	42	20	6	54	1	131	30	87	3	8	87	120	28	1144	52		
43	64	28	43	21	16	55	57	137	49	88	2	5	88	125	56	1718	10		
44	62	8	44	22	27	57	56	144	40	89	1	3	89	131	48	3437	24		
45	60	0	45	23	39	60	0	152	7	90	0	0	0	138	9	Infinite			

Ther may many cõclusions by this table be wrought as you shal know or we depart: but now let vs furder proced cõcerninge our talke of zones, in which you must cõsider that these zones of which we haue intreated, ar deuided into climates, & regions. Spo. *How doth à climat and à zone differ, they both wer for this cause first inuented, to make diuision of the face of th' earth into sõdry parts.*

Philo. *I confesse no lesse, but they differ in this poynt, that à Zone doth in it cõtain the fift portiõ of th' earth, and à climate but only so much of th' earth, & the lõgest day in that place, do differ from th' equinoctial .xxx. minutes, or half an hour, and are named .vii. in numbre, of all th' auncient Geographers.* *How a Zone & a Climate differ.*

Spoud. *Then the first climate shalbe in latitude .xvi. degrees .xliiij. minutes from th' equinoctiall, and the lõgest day, shall excede .xij. houres (whiche is the quantitie of the daye vnder th' equinoctiall) one houre: for so saithe Ptolomæus.*

Philon. *It is true, but heare you muste consider, that Ptolomæus deuideth euery climate in .iiij. equall portions, & nameth them Paralleles: euery one of them cõteining in latitude .iiij. degrees, xviij. min. incresing the quantity of the longest day .xv. minutes: so that Ptolomæus (making the first climate xvi. degrees, xliiij. min. in Latitude from th' equinoctiall) meaneth the middes, and not the beginning of the climate.* Spou. *I praye you or we anye further proceade shewe me the signification of a Parallele.* Philo. παράλληλος *in Greke (whiche we also do call à Parallele) is à Circle equally distaunt,* *Ptolomæus deuision of Climates.* *What a Parallele is.*

from that which is drawne next him, and are described by the course of the sonne and starres, of which the greateste is th'equinoctial: for that he is furdest frō the Poles, so that the nerer the poles, the lesse is the parallele: and the number of them Ptolomæus maketh .xxj. as in this figure, in which I haue made .xxj. paralleles frō th'equi-

Paralleles drawen North from the Æquinoctiall.
The Æquinoctiall
Lyne or Parallele.
Paralleles described South from Th'æquinoctiall.

noctiall, vnto both the poles Arctike & Antarctike, and now to our matter againe from whence we did digresse. You shall consider that euerye Climate hathe à proper name, for the suerer difference of one from an other:

and

& taketh his name of some notable Citye, Mountaine, or Riuer, ouer which the mids of that Climate is drawn As for example.

The middes of the firste Climate goeth ouer a notable Flande of Nilus, called Meroë & of that we name it Dia Meroes, that is, the climat going ouer Meroë.

The seconde Climat is called Dia Syënes of à citye in Egipt called Syënes.

The middes of the thirde climate is drawen ouer Alexandria, an other Citye also in Egipt & therfore called Dialexandrias.

The fourth goth ouer th' Fland of the Rodes, now in subiection to the great Turke, and is named Diarhodou.

The fift climate Dia Romes going ouer Rome somtime the head of the world, at this preset the sinck of sin.

The sixte Climate is named Dia Pontou, because it goeth ouer the Pontike seas named Euxinus.

The seuenth is drawē by Boristhenes a Citye so called & therefore named Diaboristhēneos, & not by the Ripheā Mountanes as the vnlerned sort suppose: seing that they ar at the lest. x. deg. frō this climate distaunte.

Spou. *And what was the cause that they described no places, beyōd the. 7. climate: seing that ther are many inhabitāts, (as by your words do appeare) wher you made mention of the habitable places in th' earth?*

Philo. *It was, ether because they supposed those places scāt, or with muche paines habitable for th' extreme cold: or els, that they knew not the parts North frō thē situated, as now we do,* Spou. *And do they not make*

mention of Climates drawne South from th'equinoctiall as of the North, of whiche you haue ſpoken?

Phi. They do in like maner deuide that portion, into vij. Climates: but for that they knewe no notable places, (as in the north partes from th'equinoctiall) they gaue them the names of the North Climates, with this addition Anti (that is to ſaye oppoſitie or againſte) as Antidiameroes, the Climate Southe from th'equinoctiall, oppoſite or agaynſt the north Climat, drawn by Meroë. And ſo in like ſort with th'other, as this figure ſhewith, in

South Climates.

which

which. A.B.C.D. do represente the meridian circle, A. the Northe Pole, and. C. the Pole Antarctike. B.D. th'equinoctiall. E.F. the Tropike of Cancer: G.H. the Tropike of Capricorne: the Polary circles. I.K. and. L.M. The Climates of them selfes are euident, hauinge their proper names, to them ioyned: & are drawn from B.D. th'equinoctiall, toward the poles. A.C.

Spou. Now I pray you declare the cõtinuation of the Climates, & paralleles. Philo. I wil fulfill your request. The partes of th'Earth Northwardes beinge by painfull, & dãgerous nauigatiõs found out, are deuided also into Climates, we folowing the same ordre that Ptolomæus, and th'aunciente Geographers vsed: that is, euery parallele to be distaunt from an other. 4. degrees, 18. minutes: and euery climate one from an other 7. degrees 27. minutes: geuing them in like sort apte names of the places ouer which they are drawne: so that in our time, there is founde after the same inuention 96. Paralleles, of which are made 24. climates, and for that it shall not easely be breuied in the poke of Obliuiõ, behold I haue drawne out a Table, conteining in it the paralleles & Climates with the places ouer which they directli are described: as also th'eleuation of the pole Arctike, vnto 90. degrees: and the quantity of the longest daye, answeringe vnto euery one of those degrees, whiche Table shall muche pleasure you, as hereafter it shall be euident.

The quantitie of climates & Paralleles.

A TABLE CONTEYNING THE NVMBRE th'Eleuation of the Pole Arcticke, & quantitie of the

Parralleles after Ptolomæus.	Parralleles more certayn & exacte.	The number of Climates after th'olde Grecians vse.	Climates after th'inuention of Geographers in our time.	The names of Climates & Paralleles after som notable place in them.	Th'Eleuation of the Pole arctick.	The quantitie of the longest day.
1	1		1	Vnder Th'Equinoctiall.	0 0	12 0
2	2				4 18	12 15
3	3		2		8 34	12 30
4	4				12 43	12 45
5	5	1	3	By th'Ilande Meroë.	16 44	13 0
6	6				20 34	13 15
7	7	2	4	By Syène vnder the Tro	24 11	13 30
8	8			picke of Cancer.	27 36	13 45
9	9	3	5		30 48	14 0
10	10			Bv Alexandria.	33 46	14 15
11	11	4	6	By the Rhodes.	36 30	14 30
12	12				39 3	14 45
13	13	5	7	By Rome.	41 23	15 0
14	14				43 32	15 15
15	15	6	8	By Ponte Euxine.	45 31	15 30
16	16				47 21	15 45
17	17	7	9	By Borelthenes.	49 1	16 0
18	18				50 34	16 15
19	19		10	By VViteberge.	51 59	16 30
20	20				53 17	16 45
21	21		11	By Grypsualde.	54 30	17 0
22	22				55 36	17 15
23	23		12	By Moscouia & Irlande.	56 38	17 30
24	24				57 34	17 45
25	25		13		58 27	18 0
	26				59 15	18 15
26	27		14		59 59	18 30
	28				60 40	18 45
27	29		15		61 18	19 0
	30				61 53	19 15
28	31		16		62 25	19 30
	32			By Orcades.	62 55	19 45
29	33		17		63 22	20 0
	34				63 47	20 15
	35		18		64 10	20 30
	36				64 31	20 45
30	37		19	All these Paralleles folow=	64 49	21 0
	38			ynge are drawen by places	65 6	21 15
	39		20	in Norwey, and Sweuelād	65 22	21 30
	40			&c.	65 35	21 45
31	41		21		65 47	22 0
	42				65 58	22 15
	43		22		66 7	22 30
	44				66 15	22 45
2	45		23		66 21	23 0
	46				66 25	23 15
	47		24		66 29	23 30
	48			Vnder th'Arct. Circle.	66 31	23 43
33	49				66 32	24 0

Paralleles after Ptolomæus.	Paralleles more certaine and exacte.	The names of the Paralleles after the notable places, by which they are deſcribed. &c.	Th' Elevation of the Pole Artik.	Continuall day in ſomer.	Continuall nyght in winter.
	50		67 0	23 11	22 1
34	51		67 30	33 17	31 13
	52		68 0	41 14	39 2
	53		68 30	48 6	45 8
	54		69 0	54 3	50 22
	55		79 30	59 12	56 0
35	56		70 0	64 11	60 16
	57		70 30	69 4	65 2
	58		71 0	73 13	69 6
	59		71 30	77 17	73 5
	60	Bp Laponia and the grene Lande	72 0	81 17	77 1
	61		72 30	85 14	80 17
	62	whiche after the opiniõ of ſundry	73 0	89 8	84 6
36	63	Authors do continually without	73 30	92 22	87 18
	64	ſeperation Ioine with weſt India.	74 0	96 10	91 2
	65		74 30	99 21	94 9
	66		75 0	103 5	97 14
	67		75 30	106 11	100 17
	68		76 0	109 16	103 19
	69		76 30	112 20	106 20
	70		77 0	115 22	109 20
	71		77 30	118 22	118 17
	72		78 0	121 22	118 14
37	73		78 30	124 21	118 11
	74		79 0	127 19	121 7
	75		79 30	130 17	124 2
	76		80 0	133 13	126 20
	77		80 30	136 8	129 14
	87		81 0	139 3	132 7
	79		81 30	141 21	135 0
	80		82 0	144 14	137 17
	81		82 30	147 7	140 9
	82		83 0	150 0	142 23
	83		83 30	152 16	145 13
	84		84 0	155 8	148 4
38	85		84 30	158 0	150 18
	86		85 0	160 15	153 9
	87		85 30	163 5	155 22
	88		86 0	165 19	158 12
	89		86 30	168 9	161 2
	90		87 0	170 23	163 15
	91		87 30	173 13	166 4
	92		88 0	176 2	168 16
	93		88 30	178 16	171 6
	94		89 0	181 5	173 19
	95		89 30	183 19	176 9
	96		90 0	186 7	178 22

Spou. *Can they not in like maner, draw paralleles from th' Æquinoctiall Southward as they do North, yea & geue them the same names of the Northe paralleles, with the Greke proposition anti, as thei do in climates?*

Phi. *Yes verely, & they so do, vntill by their trauels they haue found out the Regiõs, Flands, Hilles, Riuers & such notable things, of which in like sort the south climates & paralleles may take denomination. As at this preset ther ar South paralleles, which are opposite to the North, & places foũd out, of which they may veri aptly take name.*

South Paralleles.

As the parallele opposite vnto the North parallele, which goeth by the Canarian Ilands, is drawne by the Riuer Nilus, and Mons Lunæ, the Mount of the Moone.

The parallele opposite to that which is drawne by Syëne, goeth by the Flandes Mendacascar, Peuta, Necura, the greater Iaua, Candin, and the kingdome of Coilum.

The parallele opposite to that whiche is drawne by Damascus, goth by the promontory of good hope, called promontorium bonæ Spej.

The opposite parallele, to that goeth ouer the Rhodes, is described by th' Flands Seilan, & Augama. & they are antipodes vnto Italy, which dwell in Iaua the lesser. The antipodes to the Lucitanians, are those in the Flle of Seila. There be also diuers other places towarde the south coast, of which neither I haue heard of any credible person, nor yet red: & therfore can not affirme

Antipodes.

firme any certeine trueth: & will omit it vntill an other ceason.

Spou. *Yet or we procede further, I must trouble you with one doubt: & that is gathered of the Arabian Phisician Auicenna, who saieth, that th' Aëre is of best temperature vnder th' equinoctiall, & they are more fre from infirmities of the body then we are, whome you affirme to dwell in the North temperate zone. For if the paralleles be of this nature, that howe muche the nearer we are th' equinoctiall, so muche the greater is the heate: and howe muche the furder remoued from th' equinoctiall, so muche the colder the qualitie of the aire is: there must seme à manifest repugnancie, betwixt Auicenne, & the Geographers.* *Auicenna.*

Philo. *I will answer you. Auicenna meaneth not that the temperature of th' Aëre is in à meane, neither vehement hote, nor yet extreame could vnder th' Equinoctial, for that were an euident errour, but because the Sonne declineth not more then. 23. digrees. 28. minutes frō the verticall pointe, therfore ther can be no cōtrary qualitie ingendred: as horible could, so that th' Aëre is not subiect to alteration, & contrary qualities, as oures is. & that is the cause why Auicenna thought it most temperat, & hereto agreeth Hippocrates:* *Auicenna defended.* *Aphoris. 3. proposi. 1*

Αἱ μεταβολαὶ τῶν ὡρέων μάλιστα τίκτουσι νοσήματα: καὶ ἐν τῇσιν ὥρῃσιν αἱ μεγάλαι μεταλλαγαὶ ἢ ψύξιος, ἢ θάλψιος, καὶ τ' ἄλλα κατὰ λόγον οὕτως.

Mutationes temporum maximè pariunt morbos, & in ipsis temporibus magnæ mutationes aut frigoris, aut æstus, aliaq; congruenter ratione eodemmodo.

that is

that is. The mutation of times do chefely ingender ſickneſſe: and in the ſame times, great chaunge either of heate or colde, or other qualities in like ſorte.

Then ſeyng there is no mutation of qualitie of th' Aëre, it is thought temperat. And for that this place is iudged moſt temperate, there be ſome that ſuppoſe (an Eden, that is to ſay, Paradiſe, to be ſituated vnder th' Equinoctiall, as à place of pleaſure, voluptiouſnes, voide of Alteration, & cõtrary qualities: Yea, & Lira, interpreting Geneſis, (where Moſes ſpeaketh that Adam, being expulſed from this place of pleaſure & ioye, for breakyng the cõmaundement: Cherubyn kepte it with à firie ſword) ſaith that the fiery ſword is no other thinge then the burning zone. And Polybius with Eratoſthenes (as Strabo witneſſe) doth affirme the temperateſt dwelling to be vnder th' equinoctiall. Spoud. *Seinge you haue made mention of the place moſt excellent of other in the Earth for pleaſure. I pray you let me heare your minde concerning Hell the place of all other moſt horrible, & painfull, as bothe Chriſtians and Ethinckes do confeſſe.* Phil. *I will not much of that thing ſpeke, but if Hell be in that place whiche is furdeſt from the heauen, as paine & grief is furdeſt from pleaſure, and ioye: then it muſt nedes be in the center of th' Earth, whiche is to ſaye that part that is in the mids of the ſame, for that is of all other parts furdeſt from the heauen. Whych is the cauſe that not onlye we, but alſo the Poëts in their tragedies, introduce perſons comming out from vnder th' earth & call that place Hell, amonge other, Senica introduceth Thyeſtes,*

Pardaiſe where.

Lira.

Eratoſthenes. Polybius.

Hell where.

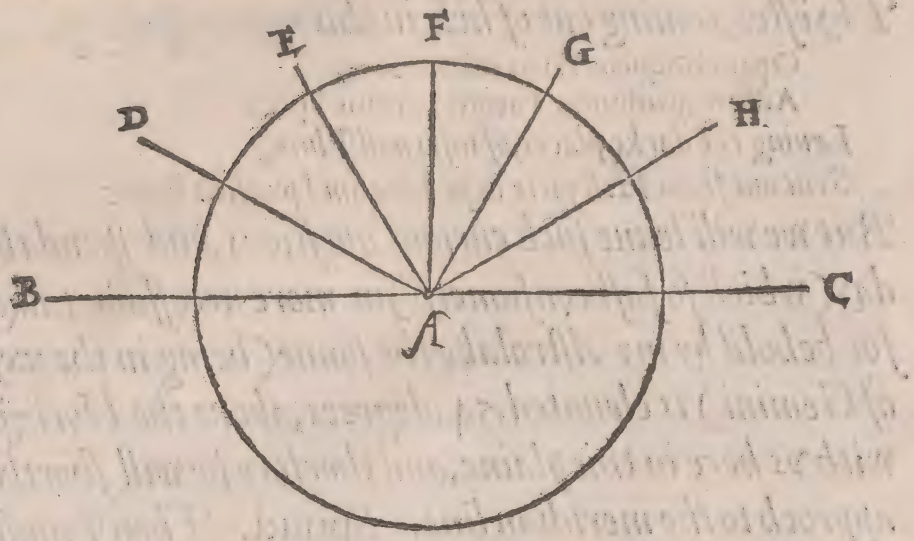
Thyëstes, coming out of hell, in this maner speking.

Opaca linquens Ditis inferni loca,
Adsum, profundo Tartari emissus Specu.
Leuing the darke places, of infernall Pluto,
Sent out from Hell pitte depe, here am I præsent lo. &c.

In Agamemnone.

But we will leaue such curious questions, and spend the day (which so fast consumeth) in more necessary talke: for behold by my Astrolabe the sonne (being in the xxj. of Gemini) is eleuated. 54. degrees, aboue the Horizõt with vs here in this plaine, and therfore he will shortlye approch to the meridian line. Spoud. *Then I muste earnestly require you, to teach me some way how I may find him beinge in this line, as also other starres: for my authors make mentiõ herof, affirming also that it is one of the chefe things wherwyth to find out the Longitud, and Latitude of places.* Philo. *I will gladly, keping not backe such waies as I also haue deuised to finde out th'aforsaid line. And first I wil begin with th'inuention of Glarian to find this none stede line, whiche is in thys manner. In any leuell and plaine place, with your compasse make à circle: in what quãtitye you please, in the center of whiche, you shall place a right Wyer, directlye standing vp, that it may geue a shadowe on the circle aforesaid. Then mark the shadow which the sonne in hys rising & gang down in thy Horizõt giueth, as for exãple. A. I s the Wier reared right vp in the center of the Circle: (the East, & B. the West. The longest shadow that the Sonne maketh aboue the Horizont is A. D: Thẽ he ascending hier, makes his shadow shorter. A. E. the None steade or Meridian shadow, whiche is shorteste*

To finde out the Meridian Line after Glarians maner.



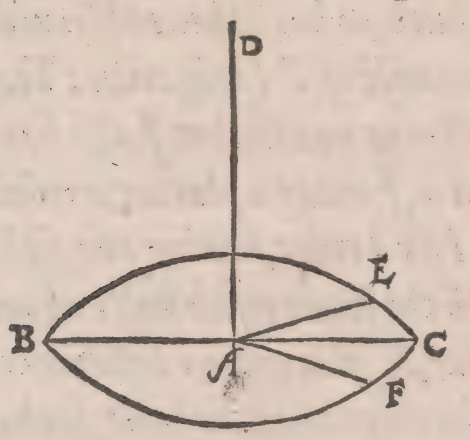
teſt is A.F. and th'other ſhadowes G.A:H.A. are in the like ſort the ſhadows which the ſone caſteth into the Eaſt, after he is paſt the meridian circle, deſcending into the Weſt. Spou. Shall it be neceſſary for to obſerue the ſhadow of the thing erected as well th'after noone, as I do from the ſonnes riſinge vntil noone?

Philo. No verely, for whan the ſhadow doth no lenger decreſe, you drawing from the center to the circumference a ſtraight line, ſhall haue your own deſire. Other willing to exchew the tedioufnes of time in obſeruation, do prouide a Plate of Meatall, well pulliſhed, or ſome thick planke ſmothe, and plained, in whiche is drawne a circle as in th'other aforſaid, with a Wyer or like thynge ſet vp right in the center, and do diligently before none obſerue whan the ſhadow of the Wier in length is equall with the circumference: and at th'end of it make a prick. In like ſorte after noone whan as the ſhadowe commeth vnto the circumference, and make there alſo a prick, thē

The ſeconde way.

with

with the compaſſe, deuide the ſpace betwixte theſe two prickes in the middes, and make there à note or pricke: after draw à right line from the center, to that middle pricke, and it ſhall alwaye ſhewe the whan as the ſonne is in the meridian or middaye line, for that eleuation of the Pole as in this example.



A. Is the Center B. E. C. F. the Circle drawne in the planke or plate of metall A. D. the Gnomon, or thing which geueth the ſhadowe, A E. the ſhadowe before Noone. A. F. the ſhadow after none: nowe deuidinge the ſpace E. F. in the middes, whiche is .C. and drawne à righte line from A. beinge the Center, vnto C. and that is the true Meridian line.

Spoudeus. *This way ſemeth muche eaſier, and facile then the other.*

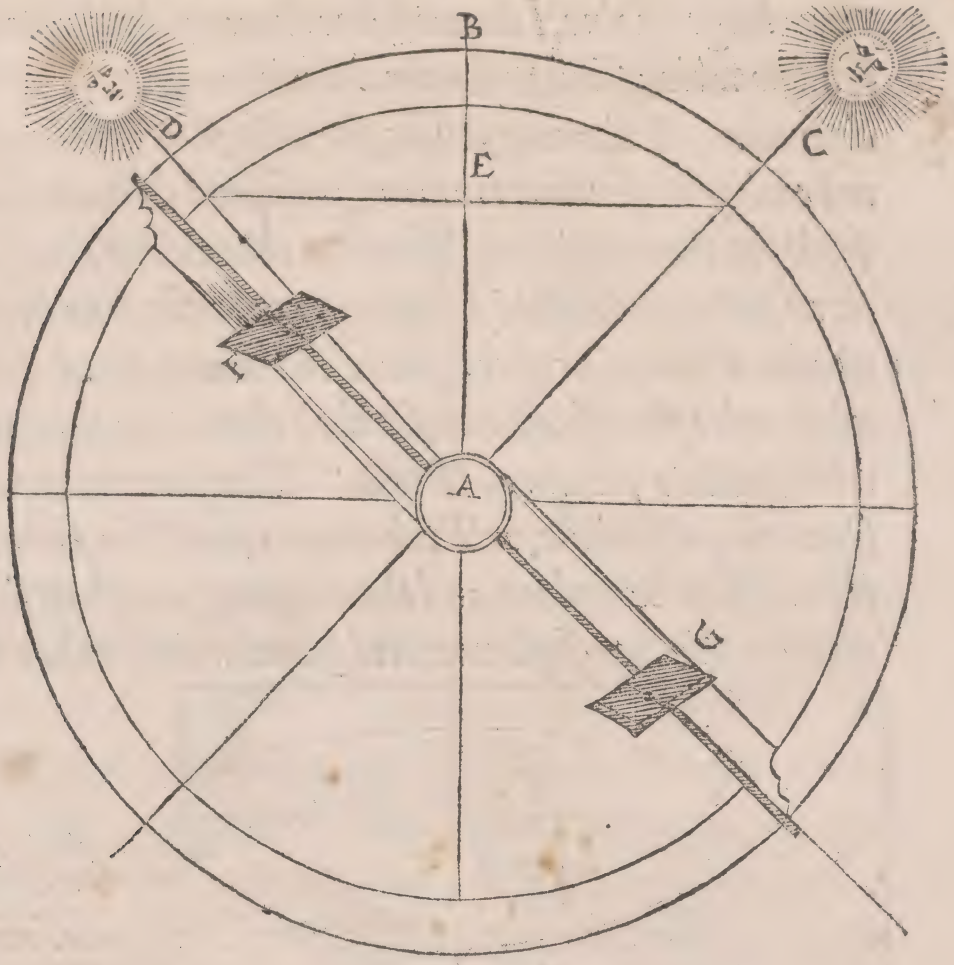
Philo. *Yea and it is alſo as certaine as th'other, and it was inuented as I ſuppoſe of Johannes de monte regio, or Vitruuius. But Vernerus vſeth no other way to find oute thys Line, then onelye a Diall hauinge à perfaite nedle, placinge it on ſome plaine, and ſmothe place: & whan the nedle ſtandeth ſtedfaſtlye in the righte Line wythin the Diall, it dothe as it were poynte directlye North and South.* The .iij. waye.

Spoud. *This waye in my iudgement doeth excell all the reſt, both for the eaſines therof & alſo (which you can not do by th'other) that you maye by it finde the Meridiane, or middaye Line, at all tymes bothe daye, nyght, & houre.*

Phil. *You may ſo, but the neadle doeth ſometime erre from right north, & ſouth, as hathe bene obſerued, & I will ſhew you in the treatiſe of Nauigation: Yea, & how you ſhall alſo correct your neadle. but I alſo haue inuented two waies, the firſt is, I make a plaine & roũde plate, in the mids of which I fix à ruler, hauing two ſightes to loke thorow, then whẽ the ſonne riſith halfe aboue the Horizont, & half vnder, I (placing my Inſtrument flat on th'earth) do direct the ruler vnto the ſame, ſo that I may ſee him thorow the ſightes: then my ruler not moued, I drawe with à Chalke, or like thing, à right lyne frõ the Center, vnto the Sõne, & whan the Sõne goeth down I do in like maner drawe an other Line: then I drawe à right Line from the Line of his riſing, vnto the Line of his goynge downe, & diuide this Line in the middes: after I drawe a right Line from the Center, vnto the middes of the ouerwart Line, thẽ I fixe in the Center an vpright wier, the ſhadow of whiche at all times ſhall ſhewe when as the Sonne is in the Meridiane Line in that habitation: but or we further procede, I wyll giue you hereof an example, in which I do make A. for the Center, then putting vpon it à wyer, or pricke, I do faſten the ruler ther on: this beyng done, I place my inſtrumẽt flat,*

The iiij. way.

& ap-



& applie the ruler with his ſightes. G. F. vnto the sõne, & drawe there à Line A. D. in like ſorte, whan he is goyng downe, & make an other Line A. C. then I draw à right Line from C. vnto D. which I diuide in the middes E. & croſſe it with à Line A. B. which is the Line at midday. But in place where I cannot haue this, or other like inſtrmẽt (whẽ as I ſe the ſõne to draw very nere the ſouth) I pricke vpright in the groũde à knife, or ſuch like thig, markig diligẽtly how lõg the ſhadow doth decreaſe, & whã as I perceaue it decreaſeth no more, but rather

The v. way.

waxe longe againe, I drawe à line from my knife, to the ſhadow which ſerueth for the Meridian line.

Spoud. I thancke you ſir, for this your gentleneſſe, in beating theſe things into my groſe, and dulhed: And I wil put them all in practiſe whan conuenient time ſhal ſerue, but in the night (I miding to take the true height of anye Planet, or fixed ſterre in the noneſtead lyne) what ordre ſhall I obſerue, for then there is no ſhadowe, which will do pleaſure. Philo. Therfore wyth ſome Quadrãt, Aſtrolabe, or Ptolomæus ruler (the fation of whiche I do here place, and the makinge you ſhall finde amonge th'other Inſtrumentes) and marke what hys

To finde the Nooneſteade Line by night.

It is made of 3. peaces, beyng 4. ſquare: As in the Picture where A. F. is the firſt peace or rule.
A.D. The ſeconde.
G.D. the third rule.
E. The Foote of the ſtaffe.
C.F. The Plumrule.
C.B. The ioyntes, in which the ſecond & third Rulers are moued.
K.L. The ſighte holes.
I. The Sonne.
H. The Zenit, or verticall pointe.
M. N. The Nooneſtead Lyne.

like case whan as he is in Capricorn. Phil. Do you so.
Spou. I imagine his none steade heighte to be. 14. degrees. 22. minutes, for because he is farre from our Zenit: from which I cannot substract the greateste declination of the sonne, answering the first degre of Capricorn, in the table of declination. Phi. Nor you shall not make anye subtraction. For like as whan he declineth North, from th' equinoctiall (which is from the beginning of Aries vnto th' end of Virgo) you shall subtracte his declinatiõ from his altitude: so in like maner, hauing his declination South (which is from the beginninge of Lybra vnto th' end of Pisces) you muste adde his declination to the meridian altitude: and subtract thẽ bothe from. 90. degrees. Spo. Then I wil end my example. I do adde. 23. degrees. 28. min. vnto 14. degrees 22. min. (the noneste de height) which make 37. degrees. 50. mi. & I take this frõ. 90. degrees, as you commaunded, and ther remaineth 52. degrees. 10. minutes as afore.

The Sonnes declinatiõ north.

The Sonnes declinatiõ south.

Phil. You haue truely wrought.
Spou. But is it not possible to finde th' eleuatiõ of the Pole euery day? for in traueling it shuld pleasure me.
Phil. It is possible to find it not only euery day, but also euery hour: but I will reserue that vntill an other season, and will shew you how to find the height of the Pole euery day, for whiche thinge I will geue you two sondrye wais: th' one without any other instrumente more then a staffe, or other thing erected to geue à shadow (whyche I haue inuented) th' other way is by the helpe of an instrument, with which I will begin. Take the sonnes heighte as be-

The third way

as before beinge in the Meridian line, then take oute of some Ephemerides his place in the Zodiake, in degrees, & minutes, with which you shall enter into the table of declination, & ther find his declination from th' Equinoctiall, answering to the said degrees, & minutes. And if it be North, thē subtracte it from th' Altitude Meridiā: or if it be South, adde it to the said Altitude: then addyng, or subtracting that numbre from 90. Digrees, there shall remayne the trewe Eleuation of the Pole.

Spoud. *Wyll it please you to let me proue this rule by an example?* Philo. *Right gladly.*

Spou. *I finde the Sonne in the sixt Digree of Gemini, whose heighte as you see is 59. Digrees 28. minutes, well nye. And nowe I finde in the Table of the Sonnes declination vnder the 6. Digree of Gemini. 21. Digrees. 37. minutes 58. secondes. Whiche I subtracting from the sonnes height, ther doth remaine 37. digrees 50. minutes, this I take from 90. digrees, & finde the place in height 52. digrees 10. minutes.*

Phil. *Let not this slide out of your memory, because it hath a singuler vse in this art, & by it you may in al places wher you trauaile, finde out the height of the Pole.*

The. 4. way. *And nowe I will shewe you my waye howe to finde th' aforesaide eleuation.*

Spou. *And shall your way serue in like maner for euery day in the yeare?*

Phi. *I find out the height of the North starre by the shadow ether .iiij. times in the yere, or els euery day the sonne being in the meridian line.*

Spou.

Spou. *Then I require you shew me first howe to finde the latitude of any Citie or towne.*

Philon. *right willingly. You shall proucide a staffe, or any right wand, in what length you please, this you shall deuide into. 60. equall portions. Then take oute of some Ephemerides, or Almanach, the day whan as the Sõne entreth into the first digree of Aries, Cancer, Libra, & Capricornus. At which times set your staffe vpright in some place: And marke the shadow how longe it doth decrease, & whã it is at the shortest, the sõne is in the noonstead place. Then at that instaunt take the length of the shadow, & enter into the Table of shadowes: & there thou shalt finde th' exacte Latitude of thy Citie. As for thy better instruction: I find in an Ephemerides the sõne to be in the firste Digree of Aries, 1558. the 12. daye of March. Therfore whan as the sonne approche towarde the south, I set my staffe directly vp, & find the shadow at midday 77. parts, 13. minutes, with which I enter the Table of shadowes (vnder this title, Æquinoctiall shadow) & can not finde my number expressed, therfore I finde next vnder my nũber seuentie sixe, 48. vnto which 52. digrees in Latitude do answere, wherfore I workinge by proportion, finde correspondent vnto 77. parts, 13. minutes: 52. digrees, 10. minutes.*

Spoud. *Then your minde is, that I shall vse the rule of proportion, in all Tables, where as the perfect nũber is not expresedly founde.* Philo. *Yea certainly.*

Spo. *Now shew how I may work euery day the same cõclusiõ.* Phi. *It differeth in no point frõ the former order*

order, sauinge that in the table of shadowes, you muste only haue respect to the columne of the sonnes altitude, & the shadow answering hereto. Then to finde the degre he is in at that present: next in the table of declination to seke out the declination of the same degree, & if it be North, subtract it from the altitude, so the remanent from .90. degrees, & you shall haue your owne desire. Spoud. But & I finde him to decline Southe, must I adde it to his altitude, & subtract both from .90 degrees, as you did in the other?

The astronomie Ringe.

Philo. In the same maner in all poyntes. There is also an other waye to finde the latitude of Regions and Cities by the helpe of the Astronomy Ringe, whiche you shall finde in my boke touching that matter, in whiche I shew the making, as also th'use of the same.

Spou. But in the night seaso, how may I find the said Eleuation of the Pole in anye place.

Philo. The Mariners vse to find out the latitude of the place by findinge the height of the Northe starre, which they call the lode starre, esteming à degre, or two, in obseruation as no error. But you shall worcke in thys maner: first find out any notable starre (that you knowe perfaitly) in the table of fixed starres, & with Ptolomæus rule, or other instrumente, obserue his heighte in the meridian line: then in the table of declination, you shall find how much he declineth North or South, from th'equinoctiall, & obseruing th'order, as you do with the searching out of the Pole by the sonnes altitude Meridiane, and declination: you shall haue your hole desire.

Spou.

Spou. *Will you nowe shewe the findyng out of the Lō-gitud- of any place from the Canariane Ilandes?*

Phi. *It is not so easie, & facile à thing, to trie th'eleuation of the Pole: but it is as harde, & laborus, to get the Longitude, which was the cause that the Auncient Geographers had onely one way, & that is by obseruing of th'Eclipses of the Mone.*

Spoud. *I remember Strabo affirmith the same.* *Lib. 1. fol. 6.*

Phi. *There is in dede no way so parfit, & suer, as by th'Eclises: therfore king Atreus is worthy eternall fame, which was the finder out of th'Eclipses of the Sonne, & Mone, (1205. yeares before Christ our Sauiours incarnation) by whose trauaile we receaue this benefite.* *Atreus found first oute the time of Eclipses.*

Spoud. *Not we only, that are presētly liuing: but also such as haue bene before vs, & also those that shall here after folowe. But what is the cause of hyr obscuration, doeth not she at that time lose in dede hyr light?*

Phi. *No verely: For it is directly against Aristotle, & all Philosophers well neare, to confesse that the supercelestiall bodies are subiect to alteration, yea or to affirme, anye coloure in them. But I wil let that passe, & wil show you the cause of her eclipsing, which is no other thing, thē the mone being (in oppositiō of the sone) ether in the hed or tail of the dragō: the shadow of th'erth is betwixt the mone, & our sight. So that as longe as she is in perfit oppositiō & without latitude, so lōg doth she cōtinue in darknes.* *Aristotle.* *The cause of the mone Eclipsed.*

Spo. *And is she not Eclipsed at no other time then only at the Ful?*

Phil. *No certeinly & therfore Lucan doth aptly in his first boke opē the cause, &*

time of the mones Eclipsation, in these versis. *you muste*

— Cornuq; coacto,
Iam Phæbe toto fratrem cum redderet Orbe,
Terrarum subita percussa expalluit vmbra.

VVhan as the mone vnto the world, her brother Titan bright
In forme wold represent, shining with face both full and round:
She sodenly was sore wounded, and therwith left her light,
Titan causing th' earthes shadow, her beauty to confound.

Spou. *These verses are short, & very full of eloquẽce.*

Phil. *Yea & they are also easy to be vndarstand, for she neuer resembleth the figure of the sonne (whõ Poëts call her brother) but only whã she is at the ful, at which time beinge in th' opposite place to him, th' earthe (as I saide) shadoweth her from oure sightes. But let that passe, and beholde to serue thy vse in this behalf, I haue calculated such Eclipses of the mone, as shall happẽ frõ the yeare of oure Lorde.* 1560. *vntill the yere.* 1605: *Applying the time of ther beginning, in yeares, daies, houres, & minuts, vnto the meridiã of Norwich exactly, whiche is.* 22. *degrees, and.* 30. *minuts, from the Canarian, or West fortunate Ilandes.*

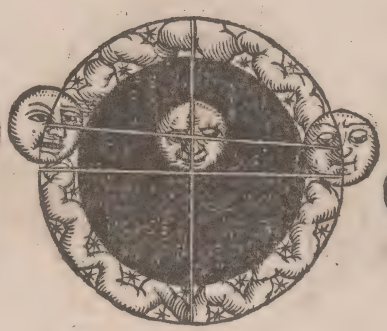
1560. ¶ March.			1562. ¶ Iuly.			1563. ¶ Iuly.		
Daye.	Houre.	Minute.	Daye.	Houre.	Minute.	Daye.	Houre.	Minute.
11	16	6	15	14	4	5	7	34

Nouem-

Spou. Wil
gitude
P

1565. ¶ Nouember.			1566 ¶ October.			1567 ¶ October.		
Daye.	Houre.	Minute.	Day.	Houre.	Minute.	Daye.	Houre.	Minute.
7	11	36	28	2	44	17	13	53

1569 ¶ Marche.			1570 ¶ February			1570 ¶ August.		
Day.	Houre.	Minute.	Day.	Houre.	Minute.	Daye.	Houre.	Minute.
2	14	57	20	5	20	15	9	5



1572 ¶ Iune.			1573. ¶ December.			1576. ¶ October.		
Day.	Houre.	Minute.	Daye.	Houre.	Minute.	Day.	Houre.	Minute.
25	9	10	8	7	25.	7	9	12

1577.
¶ Aprill.

Day.	Houre.	Minute.
2	6	29

1577.
¶ September.

Daye.	Houre.	Minute.
26	10	37.

1578.
¶ September.

Daye.	Houre.	Minute.
16	12	24

1580.
¶ Ianuary.

Daye.	Houre.	Minute.
31	8	36

1581.
¶ Ianuary.

Daye.	Houre.	Minute.
19	8	38

1581.
¶ Iuly.

Daye.	Houre.	Minute.
15	15	0

1584
¶ Nouember.

Daye.	Houre.	Minute.
8	11	18

1587.
¶ September.

Daye.	Houre.	Minute.
6	8	54

1588
¶ Marche.

Daye.	Houre.	Minute.
2	13	22

1588.
¶ August.
Day. Houre. Minute.
25 14 47

1589
¶ August.
Day. Houre. Minute.
15 6 8

1590
¶ December.
Day. Houre. Minute.
30 7 15

1591.
¶ December.
Day. Houre. Minute.
19 14 48

1592
¶ Iune.
Day. Houre. Minute.
14 8 7

1592
¶ December.
Day. Houre. Minute.
8 6 31.

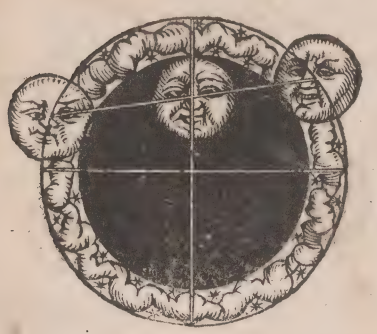
1594
¶ October.
Day. Houre. Minute.
18 17 8

1595
¶ Aprill.
Day. Houre. Minute.
13 14 15

1596
¶ Aprill.
Day. Houre. Minuter.
2 7 57

1598
¶ February.

Day.	Houre.	Minute.
10	16	31



1598
August.

Day.	Houre.	Minute.
6	5	28.

1599
¶ Ianuary.

Day.	Houre.	Minute.
30	16	30

1601
¶ Nouembre.

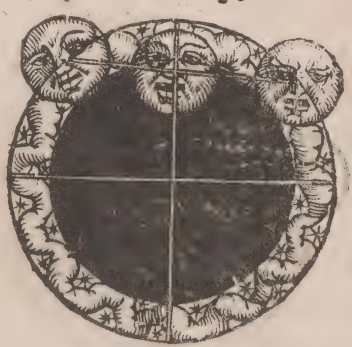
Day.	Houre.	Minutes.
29	5	9

1602
¶ May.

Day.	Houre.	Minute.
25	4	56

1603
¶ May.

Day.	Houre.	Minute.
14	10	39



1603
¶ Nouember.

Day.	Houre.	Minute.
8	7	7

1605.
¶ Marche.

Day.	Houre.	Minute.
24	7	15

1605.
¶ September

Day.	Houre.	Minute.
16	14	49

Whan

Whan

Whan as thou wilt finde the longitude of any Region, Country, or Village, by an Eclipse, do in this manner. Obserue diligently the perfaite time, whan as she beginneth to be eclipsed (either by some perfait Dial, or clock, or els by the heighte of some fixed sterre) and if the time of hyr beginninge, do agree with that whiche thou shalt find here calculated, know certainly that thy Meridian and longitud, is all one with Norwich: but if they differ, do in this order. Subtract the lesser time, from oute of the greater, & the differẽce turn into degrees, & mi. of the Equinoctial. Thẽ if the time in the beginning of her obscuration be more, then that which I haue heare placed: adde this difference in degrees, and minuts, vnto the lõgitude of Norwiche, (because the place is East from it, and you shall haue the perfait lõgitude. But and she begin soner with the, to be Eclipsed then is here mẽtioned, subtract the difference aforesaid in digrees & minuts, from the Longitude of Norwiche (because thou arte West from it) & you shal haue the Longitude desired.

Howe to finde the Longitude of Regions by an Eclypse.

Spou. *Howe shall I torne the houres, & minutes of the day into digrees, & minutes of th' Equinoctiall?*

Philo. *You must giue to euery houre, 15. digrees: & to euery 4. minu. of an houre, one digr. of th' Equinoctial: & euery minu. of an houre, 15. minu. of th' Equinoctiall: as this Table folowyng shall alway declare. And nowe I wyll giue you à twofould example. Anno Christi. 1558. the second day of Aprill, there was à great Eclipse of the Mone, so that she was darkened x. pointes well nere, & began to come vnder the shadowe of th' Earth at Nor-*

How to turne the houres of the daye into degrees & minuces.

An obseruation of an Eclipse.

wich, at x. a clock 37. minutes at night (as by taking the height of à fixed sterre, called the virgins spike, did euidently appeare) now willing to note mens obseruations in other places, I finde that Leouitius Cyprianus, in hys boke of Eclipses, apoyntethit to begin at Augusta in Germany 23. min. after xi. a clock at night. Then to find the longitude of Augusta frō Norwich I subtract. x. houres 37. min. frō xi, houres 23 min, ther remaine 49, minuts,

A TABLE, SERVING TO THE CONuerting the houres, and minutes of the day: into digrees, and minutes of th' Equinoctiall.

	Th'ark of th'equinoctiall in				Th'arke of th'Equinoctiall in			
Hou. of the day	Digre.	Mi	Second	Mi. of hou.	Digrees	Min.	Secō.	Third
1	15	2	30	1	0	15	2	3
2	30	5	0	2	0	30	5	0
3	45	7	30	3	0	45	7	30
4	60	10	0	4	0	0	10	0
5	75	12	30	5	1	15	12	30
6	90	15	0	6	1	30	15	0
7	105	17	30	7	1	45	17	30
8	120	20	0	8	2	0	20	0
9	135	22	30	9	2	15	22	30
10	150	25	0	10	2	30	25	0
11	165	27	30	15	3	45	37	30
12	180	30	0	20	3	0	50	0
13	195	32	30	25	6	16	12	30
14	201	35	0	30	7	31	15	0
15	225	37	30	35	8	46	27	30
16	240	40	0	40	10	1	49	0
17	255	42	30	45	11	17	1	30
18	270	45	0	50	12	32	5	0
19	285	47	30	55	13	48	2	30
20	300	50	0	60	15	2	30	0
21	315	52	30					
22	330	55	0					
23	345	57	30					
24	361	0	0					

with which I enter into this table, & finde answeringe to.46.minutes of time.11.degrees.30. minu.of th'equinoctiall, & because that the beginning of the Eclipse, is later at Augusta, then at Norwich, it sheweth the situation to be East from it. Wherfore I adde the difference of time tourned into degrees vnto 22.degrees 30.minu. (the longitud of Norwich) & ther ariseth.34.degrees the longitude of Augusta. In like manner 1559.the.xvi. day of September, at 3.of the clock 19.min.after dinner, the mone shall begin to be darckened at Norwich, whiche at Tolet in Spain shall happen at 2.of the clocke.22. minutes. The difference in time is 47.minuts. I conuert them into degrees, & minutes of th'equinoctiall (as before) & finde 11.degreet 50.min. And because that the Mone is darkned soner at Tolet, then Norwich, I subtract this difference frō Norwich & finde.10.degrees, 40.minutes, the longitude of Tolet which is West from Norwich. Spo. *But this Eclipse of the Mone, shall not be sene in the beginning, nether ende at Norwiche, or Tolet?* Phi. *True it is, because the Mone being in the perfit opposition of the sonne, can not shew her self aboue our Horizont, before the sone be vnder th'Earth, which is not vnto.6.of the clocke.*

Spou. *How can you then shew the true time of her beginning at Norwiche, or Tolet, whan as she is not sene of their inhabitauntes?* Philo. *right perfetlye. Conferring the meridian of Norwich, or Tolet, wyth other places East from them, whereas the beginninge shallbe plainly of these inhabitants perceiued. But in this place*

it is

it is broughte in onlye for example. And althoughe thys waye of finedinge the true longitude be bothe certain, and mooste easiest of all other: yet it hathe this discomodity, because th'eclipses happen rarely, and seldom, as twise in à yere at the most, & sumtime but once in .ij. yere. Furthermore ther hapeneth sumtime impedimẽts that at the time also of her Eclipsing, we cannot obserue her beginning or end, either because the cloudes are betwixt our sight, & her, & so is shadowed: or els that she is vnder our Horizont, at that preset season. Wherfore P. Apiã practised an other way, how to find out th'aforsaid Longitude, yea & that euery night & hour of the same, so that the Mone be aboue the Horizont, & the aire cleare and faire.

Apians waye to find out the Longitude of places.

Spou. We are bound to haue him in much estimatiõ, which by his labours, hathe supplied that we did wante: but what is his inuention? Phil. I will shew you, ther are thre thinges required vnto this busines, the Astronomers staffe, also called Iacobes staffe (the makinge of which you shall finde among th'other instrumentes) the second is the true place of the Mone in the Zodiake, in degrees, & minutes, for the hour you make obseruatiõ, (whiche you may take out of an Ephemerides) and the iij. is the longitude of a fixed sterre, which you may take out of the Table of fixed sterres in my firste boke. These had, you muste take your staffe with the Crosse on it. and applye the one ende of the Crosse to the Center of the Mone, and the other vnto the sterre: which thing to do, you shall remoue the Crosse vp and downe, vntill th'endes

Iacobes staffe.

Fol.27.

the endes of the ſtaffe touch both the center of the mone & alſo of the ſterre. Thys ended, the croſſe ſhall ſhewe you what the diſtaunce of the Mone, & ſtarre is in degrees & minutes. Then take the diſtaunce in degrees, & minuts of the Mone, & fixed ſterre, which you had before the obſeruation: And ſubſtract theſe. ij. diſtances, th'one out of th'other, the remanet deuide by the portiõ that the mone moueth in one hour, And that ſhall ſhew you the time, whan as the Mone was ioyned wyth the ſtarre (if the ſtarre be Weſt from her) or whan ſhe ſhall be ioyned with the ſtarre, if it be Eaſt from the Mone. This time being had, you ſhall turne it into degrees, & minutes of th'equinoctiall, (as I ſaid in th'other precept afore, & the table ſheweth) & if the mone be Weſt of the ſtarre, do in this manner. Marcke whether the difference of the mone, & ſtarre found by thy obſeruation, be greater then the difference foũd by the ephemerides, & the lõgitude of the fixed ſtarre: if it be leſſer, thẽ ſubtract the time turned into degrees, & mi. from the meridian for whiche th'Ephemerides are Calculated, becauſe thy place is weſt from it: but and the difference be greater, then adde the degrees, & mi. to the Longitude (for which th'Ephemerides ar ſupputated, becauſe thy place is Eaſt from it) & ſo ſhalt thou haue the true Longitude deſired. Moreouer thou muſt conſider if the Mone be Eaſt frõ the Sterre, then thou ſhalt worke contrary (that is to ſay) if the diſtaũce found by obſeruatiõ, be leſſer thẽ th'other, you ſhall ſubtract it frõ the lõgitud knowẽ, becauſe thi place is weſt frõ it, but & this differẽce be

Whan the Mone is Weſt of the Starre What is to be wrought.

Whã the mone is Eaſte of the Sterre.

be greater, then adde it to the fornamed Longitude, because thy place is East from th'other: & so withoute erroure, thou shalt haue thine owne desire. And this waye also, is excellente to correcte the course of the Mone, and amend the tables, out of which hir mouinges are taken: if they do erre at any time. Spo. *I must neades confesse your words true, whā you said how much any thing excelled other in knowledge, so much the more it was cōpanion with difficultie. For except you geue me an exāple, I shall neuer attain the perfait meaning hereof.*

Philon. *I will geue you an exāple of that time, which I obserued my self to find out the lōgitude of Norwich.*

An example, *Anno. 1558. the second day of February, at. x. a clocke at night, I found the place of regulus (called also the lions hart) in longitude degrees. 23. 32. minut. in Leo: the Mone also at that present, in the. xxi. degree. xl. min. of the same signe (hir place being calculated for Anwarp, which is xxvi. degrees. xxxvj. minutes) I subtracte the place of the mone, from the longitude of regulus, the distance. j. degre. lij. min. that she is West, from the sterre. Then I take my staffe & (with one eie closed) I moue the crosse vp & down, vntill th'one end was equall with the Center of the Mone, th'other ende with the Starre. Then I find by that obseruation, the Mone to differ frō regulus, j. degree. 43. min. This numbre I take from the first difference, ther remaineth 9. minutes. Thē inquire I out, how many min. of time, answer vnto. 9. min. of the Mones course, (making the Mone to moue in one hour xxxv. minutes, & find. xvj. minutes of time: which turned*

ned into degrees of th'equinoctiall, make. 4. degrees: & becauſe the Mone is Weſt of the ſterre, & the diſtance found by the ſtaffe leſſe in number, therefore I ſubtracte the. 4. degrees from the longitude of Anwarpe, & there remaine. 22. degrees. 36. minutes, which differ littel frō the other obſeruations.

Spou. The difference of. 6. minutes in Longitude, is ſmall or no error, whan as. 15. minutes of th'equinoctiall, make but one minute of time.

Phil. True it is.

Spoud. By youre exāple, the precept ſemeth more euident, & I miſtruſte not, but with diligence to make in other places, the like obſeruation.

Phi. I will open vnto you an other waye to finde the Longitude of any region, in euery place, as well daye, as night, & that euery houre, moſt neceſſary for thē, which either ſayle, or trauell. *Another way.*

Spou. But you do then obſerue the diſtaunce of the places, in miles.

Phil. No verely, for if I were caried by lande into places vnknowē (blindfilded, as they terme it) or by the violence of troubleſome wether, on the ſea, driuen from my courſe, I can declare how many miles I am from my countrey, & how many leaques from my proper courſe.

Spoud. Then ſurely, it muſt haue in it muche difficultie, ſeyng that there ſpringeth of it ſo muche vtilitie, and profite.

Philo. The waye is very facile, & without great laboure, & I will no lenger make you muſe theron.

You ſhall prepare à parfait clocke artificially made, ſuch as are brought from Flaũders, & we haue thẽ as excellently without Temple barre, made of our countrymen. Spoud. *Do you not meane ſuch, as we vſe to weare in the facion of à Tablet?* Phi. *Yea truely, when as you trauell, you ſhall ſet the nedle of youre Diall exactlye on the hour found out by the ſonne on the daye, & by ſome ſtarre in the night: thẽ traueling withoute intermiſſion, whan as you haue traueled .xx. yea .xl. miles or more (if your next place, whoſe longitude you deſire be ſo far diſtant) then marke in your Diall, the houre that it ſheweth: after with an Aſtrolabe, or Quadrant, finde out the hour of the day in that place: & if it agre with the ſame which your clock ſheweth, be aſſured your place is north or South frõ the place you came from, & therfore haue the ſame lõgitude, & meridiã line. But & the time differ, ſubtract th'one, out of th'other, & the differẽce turn into degrees & minut. of th'equinoctiall as before, then adde or ſubtract, as in th'other .ij. precepts, going before.*

But now behold the ſkie is ouer caſt with cloudes: wherfore let vs haſte to our lodgings, & ende our talke for this preſente.

Spoud. *With a righte good will.*

THE THIRD BOOKE OF THE

Cosmographicall Glasse: in which is vttered the making and protracture, of the Face of th' Earth, both in Cartes Perticuler, and also vniuersall, with diuers necessarye thinges, incidente hereto.

Philonicus.

SEINGE THAT in oure laste daies talke, it was made euidente vnto you, what the Longitude, Latitude, & Circuite of th' Earth was, how you also might find the same by diuers & sondrye waies: moreouer the deuision of th' Earth into zones, by the helpe of Paralleles: it shuld seme nowe conueniente, to shewe you the cause wherefore all these are learned, & to what finall end they are desired. Therfore, leaste you shulde be lefte destitute of the principal tresure of Cosmography, that is to delineat, protract, or set forth the plat forme of th' vniuersall face of th' earth: or els perticulerli any one portiõ of the same: I will this day also do my endeuor, to shewe you the waye how to attain hereunto. Spo. Wold to god, that fortune had vnto me geuẽ of her tresure, that I might sõwhat (al though not recõpẽce) yet shew forth my good wil for this your great pains, & trauell. For in dede siluer & gold, is to base to recõpence knowledge with, & that did the famous kinges & princes in th' old time well perpende:

The principall part of Cosmographie.

The noble reward, of learnyng in times paste.

Whan they did not only geue th'inuentors (of any new Science, Art, or profitable thing for à publike weale) aboundaunce of treasure: but also for perpetuall memorye, made an Image to represente suche à persone, and called him à God for his inuention. So was Neptunus called God of the seas, for that he founde the Arte of sayling. Æolus, the God of windes, because he inuented the true vse of them. Ceres à Goddesse, for finedinge out tillage. But what make I discourse in these thinges to you, whiche knowe them muche better then I.

Neptunus.

Æolus.

Ceres.

Ph. *Heare by I gather your good will to th'aduancemente of learning. But it is not treasure which at youre handes I craue, but only that you shew your selfe enemy vnto ignoraunce, thorowe your industrious labour, both in profitinge your selfe, & also your natiue country. But or we procede further in thys oure busyneSSe, I wyll brieflye open vnto you certaine names, whiche we vse in Geographie, with th'interpretation of the same: and histories with Poëtes abound also with them. And firste you muste consider that th'Earthe beinge inuironed, & compassed aboute with the greate Ocian seas, semeth as it were an Flande (after Strabo his minde) notwithstandinge there is à greate difference betwixt an Fland, and th'Earthe: for an Flande, is a portion of th'Earthe seperated from the hole, by waters whiche do circuite it on euerye side, so that you can not iourney by lande, either from Europe, Asia, or Afrike vnto your coũtry, but muste vse herein Nauigation.*

What an Ilande is.

Spou.

Spoud. *Vnto your description do agree, America, Sicilia, Jaua, the Rodes, Candie, Delos, Therasia, and England, in which we inhabite.*

Philon. *It it true, now you shall furder note that the seas deuide th' Earth. 4. sundry waies, for either it is an Iland, or little differing there from (and therfore called Peninsula) or Isthmus, or Continēs.*

Spoud. *So that Peninsula, differeth from an Ilande, because in some parte, it is ioyned to à greater portion of th' Earth wythoute seperation: as Taurica, Thrasia, Cherronesus, also Cymbrica & Aurea, in Jndia.* Peninsula.

Philo. *Jsthmus, doeth differ from them bothe & signifieth à portion of th' Earthe, hauynge of eyther sydes the raginge Seas: suche are founde agreable to this description properly, Corinthiacus, and Thrasius.* Isthmus.

Spou. *But howe doeth Continens differ from these three?* Continent.

Ph. *J will shew you, it is à portiō of th' Earth, which is not parted by the Seas à sounder, but is continually in length, so that you may go from one parte vnto another without nauigation: as Saxonie, Bohemie, Sueuelande, &c.*

Spod. *By these J gather there is no portion of th' Earth, but it is either an Ilande, or that whiche you call Peninsula, Isthmus, or Continens.*

Philon. *No verely, but nowe beholde the figure. Yet ther remaineth to shew you what this worde, Oceã Sea, meaneth, what we call Promontorium, Fretum, Lacus, Stagnum, Fluuius, Palus, &c. which I reserue vntill we speake of Nauigation: And nowe we will tourne to our scope. You shall cõsider that the face of th' Earth is protraste, & drawne two sundry waies: either on à roũd plate forme, for which inuention the Globe moste aptlye serueth: or els on à plaine plat forme, as à Card in which we drawe th' vniuersall Earth, or els but the half, or the one part: yea, & you please but one particuler Region: which is proper to Chorographie (as I said to you in the first booke.* Spo. *Th' inuention should seme much better to drawe th' Earth in à playne plate fourme, theron à Globe, for in it, we maye beholde the whole face*

An obiection against the terestriall Globe.

of

of th' Earthe, wythout anye remouynge or tournynge of the Carde: & on the Globe you ſhall be compelled to turne firſte one parte, & then another, or you can vew any great portion of it.

Phil. *Yet becauſe it doeth moſt euidently in figure, repreſent the forme of th' Earth, it ſhould ſeme more apt for this inſtitution. But I will leaue his compoſition vntill I ſhewe you the making of it among other inſtrumẽtes. And your cauſe alleaged againſt this forme, as I ſuppoſe, did miniſter occation to Ptolomæus, to delineat, & deſcribe th' Earth in à plaine forme. And bicauſe that right lines onely vſed in this buſines, did cary errour with them (as the fornamed Ptolomæus noted in Marinus the Geographers inuention) therefore he vſed in this protraction, ſuche lines as might anſwere proportionallye, the lines diſcribed in a Globe: But nowe I will leaue to vſe more wordes herein, & will begin the work it ſelf. And leaſt that the difficultie of the thing mighte ſomwhat diſcouragie you, I will firſt noſel & traine you vp in making a cart for à Region. But here note that à perticuler card is made by knowing the diſtance of places: without Longitude & Latitude of Regions, which forme of working I wyll here after open: or by Longitudes, with which firſte we will begin. And then ſhewe you the making of à Carde, for the eight part of th' Earth, after for halfe th' Earth, & laſt for the hole vniuerſal face of th' Earth.* Spoud. *I thanke you ſir, & nowe I perceiue your great care in obſeruing à methode, & order in teaching, with the manifolde vtilitie ſpringing of*

Th' Anſwere.

A particuler carde, made. ij. waies.

The argument of the thirde booke.

the same: But seing you wil begin first with the descripsion of à Regiõ, I pray you let your diligence that waye bende, to the settyng out of our countrey. So shall the example be the more familier, & your paines nothing the greater.

Phil. *I wyll accõplish your desire, in describinge à perticuler Regiõ, Countrey, or Prouince, Firste you shall drawe à right line in such length (in the middes of your parchement, or paper) as it will aptly receiue. This line shall represent the meridiã Line for the middes of that Regiõ. Then diuide this line into so many equal portiõs, as the latitude of the regiõ is: drawynge right Lines, or paralleles, in euery of the same diuisiõs, according to the capacitie of the plat forme of thy paper, or parchement, & write on th'endes of these paralleles, 32. 33. 34. or 40. 41. 42. according to their distaunce frõ th'Equinoctall. after you shall cõsider howe many digrees the north part of your regiõ is frõ th'equinoctiall, & entringe into this Table folowing (which is intituled the quãtitie & proportiõ of th'Equinoctall, or any great Circle, vnto euerye parallele both North and Southe from them) searche how many minutes, and secondes answereth to the furdest of these degrees in latitude, & with thy compasse, take the like space in anye of the diuisions of latitude: and then beginninge at the hier parte of the Carte (for that shall represente the Northe parte) make prickes with thys compasse from the Meridiane line, on bothe sides:*

The maner of making a perticuler Carte for any Regiõ.

A PROFITABLE TABLE, SHOVVING THE quantitie, and proportion of th'Equinoctiall, vnto euerye Parallele, both towarde the Pole Arctick, & Antarctick, making euery digree 60. minutes.

Latitude of Paralleles.				Latitude of Paral.				Latitude of pural.			
Dig.	Mi.	Se.	Thir	Dig	M	S.	T.	De.	Mi.	Sec.	Th.
0	60	0	0	31	51	25	48	62	28	10	6
1	59	59	27	32	50	52	58	63	27	14	22
2	59	57	18	33	50	19	13	64	26	18	8
3	59	55	4	34	49	44	32	65	25	21	26
4	59	51	14	35	49	8	57	66	24	24	15
5	59	46	18	36	48	32	28	67	23	26	38
6	59	40	17	37	47	55	5	68	22	28	35
7	59	33	10	38	47	16	50	69	21	30	7
8	59	24	58	39	46	37	44	70	20	31	16
9	59	15	41	40	45	57	46	71	19	32	3
10	59	5	18	41	45	16	57	72	18	32	28
11	58	53	51	42	44	35	19	73	17	32	23
12	58	41	20	43	43	52	52	74	16	32	18
13	58	27	20	44	43	9	37	75	15	31	45
14	58	13	4	45	42	25	35	76	14	30	55
15	57	57	20	46	41	40	46	77	13	29	49
16	57	40	33	47	40	55	12	78	12	28	29
17	57	22	42	48	40	8	52	79	11	26	55
18	57	3	48	49	39	21	49	80	10	25	8
19	56	43	52	50	38	34	2	81	9	23	10
20	56	22	54	51	37	45	33	82	8	21	1
21	56	0	53	52	36	56	23	83	7	18	44
22	55	37	52	53	36	0	32	84	6	16	18
23	55	13	49	54	35	16	2	85	5	13	45
24	54	48	46	55	34	24	53	86	4	11	7
25	54	22	42	56	33	33	6	87	3	8	25
26	53	55	40	57	32	40	42	88	2	5	38
27	53	27	37	58	31	47	43	89	1	2	50
28	52	58	37	59	30	54	8	90	0	0	0
29	52	28	38	60	30	0	0				
30	51	57	4	61	29	5	19				

both sides: then accompte howe farre distaunte the south parte of thy Region is from th' Equinoctiall, & by the helpe of the Table you shall knowe howe many minutes answereth to one digree: then with your cõpasse take the like proportion of the digrees of Latitude, & your compasse not opened wider, make prickes from either syde of the meridian line in the lower part of the Carde, for that signifieth the south coast of that regiõ. After draw right lines from the prickes in the hier part of the Table, vnto the Prickes in the lower part. And write in them the degrees of Longitude, as. 10. 11. 12. or. 20. 21. 22. & then is thy carde made ready to serue thy necessary vse.

Spou. *This beinge ended, what is then requisite to be obserued to the perfait finishing of this carde?*

Phil. *Only to seeke oute of Ptolomæus Geographie, or my fifth booke, the latitudes of Cities, Townes, Villages, Hilles, Riuers, or other notable thinges in that Region conteined, & accordinge to those nõbres, to place thẽ in your card, or mappe.* Spou. *I do not so muche fansye Ptolomæus, in lõgitudes & latitudes, for he was not able being so mighty à Prince to trauell into those countris, that to à priuate person (for the greate distaunce à sunder) was impossible. And therfore receiuinge (as he confesseth) obseruations at other mens handes, dyd in many sundry places swarue from the trueth.*

Ptolomæus excused.

Ph. *And that was not to be imputed vnto Ptolomæus as à crime, seyng the errour ensued by other mens obseruations. But for this cause I haue made my fifthe Booke, in the whiche, I haue folowed Ptolomæus in*

certeine

certaine pointes touchinge his natiue Countrey, & places to them adiacent. In th'other, I haue vsed later writers trauelles, not omitting my owne as you shall euidẽtly perceaue.

Spoudeus. *I pray you giue me an example of these thinges spoken.*

Phil. *Here minding to describe the plat forme of Englande, I draw (as you se) à right line in the middes of the Mappe. And because I finde in my fift boke, that it is frõ the Weast part of the same to th'East.* 11. *digres: I diuide this streght line (beynge the Meridian Line, for the middes of this Regiõ) into xj. equall partes, or portions: Then do I searche how much the Pole Arctik is eleuated aboue th'Æquinoctiall, in the furdest north part of Englande: & finde it* 61. *(for vnder the name of Englande, I comprehend the whole Ilande cõteyning also Schotlande, & Irelande.) Therfore I enter into the Table goyng before, & finde answering to* 61. *digr.* 29. *minutes,* 5. *secondes,* 19. *thirdes. Which space, I take with my cõpasse in one of the diuisiõs of Lõgitude, that I made in the meridian line, & so my compasse not opened wider, I begin at the Meridian Line in the higher part of the Card, & make on either side* 5. *pricks (that is to sai) v. on the left hãd, & v. on the right hãd. in like maner I find the south part to differ frõ th'equinoctial lj. di. wherfore entring into the Table, I find answering to lj. dig:* 37. *min.* 45. *seco.* 33. *thir. And with my cõpasse I take the like portion in one of the diuisions of the Meridian line, & then with my compasse I diuide the lower parte-*

An example.

of

of the Table, as I did the hier. Then draw I right Lines from the Prickes in the hier part of the Table, vnto the prickes in the lower part: & wright at th'endes of them, the Digrees of Lõgitude, as also in the diuisiõs of the Meridiam line, I wright the digrees of latitude. Thẽ seke I in the fifth boke for the notable Cities, Townes, Villages, & suche like, & place them in this card, according to their true Longitude, & Latitude, as in the card of Englãd following you may well perceiue.

Spoudeus. Nowe I perceiue by the makinge and describyng of this onely Mappe, that the whole worke doeth chiefly depende vppon the Meridian Line, appointing by them the longitudes of Regiõs: & by Paralleles of Climates, whose vse in à Carde, is to limite the Latitude frõ th'Equinoctiall. So that obseruing this order of you prescribed, I may in like sorte at my pleasure, drawe à Carde for Spaine, Fraunce, Germany, Italye, Græce, or any perticuler regiõ: yea, in à warme & pleasaunt house, without any perill of the raging Seas: danger of enemies: losse of time: spending of substaunce: werines of body, or anguishe of minde. Oh how precious â Iewell is this, it may rightly be called à Cosmographicall Glasse, in which we may beholde the diuersitie of countries: natures of people, & innumerable formes of Beastes, Foules, Fishes, Trees, Frutes, Stremes, & Meatalles. Phi. You shall haue iust occasiõ so to affirme, whan as you vnderstande the whole cõmoditie of the same. But I will shewe you to describe iij. or iiij. Regiõs in one Mappe: yea, or so manye as are cõteined in

Cosmographicall Glasse.

the

th'eyght portion of th'Earth. And therefore I call it à Carde, conteining th'eyght part of th'Earth, whose com-

passe, in what quãtitie you please (the greater the better) & note it with A.B.C for the easier vnderstanding, vntill you are exercised herein. Then deuide the compasse of this Circle in iij equale partes, & marke the pointes of the diuision, with A.B.C. After place th'one ende of the cõpasse in A. & stretche out th'other ende vnto B. or C. & with thy compasse draw an arcke, or portion of à Circle, from B. to C. Then set th'one ende of the compasse in B. & draw the like arcke frõ A. vnto C. After place the one ende of thy cõpasse in C. & describe the like arck frõ B. to A. And here note that A. doth signifie the North, or south Pole. And th'arke B. C. the quadrant, or iiij. part of th'Equinoctial Circle. This arke B. C. you shall diuide equallye in the middes, & at that pointe place D. Then draw à right line from A. vnto D. this shall repræsent the meridiane line for the middes of this carde. This line shall you diuide into 90. partes, & euery one shall repræsent à digree: or into 18. portions, & euery one shall answere vnto v. digr. Or (if the Mappe be small) into 9. portions, & euery suche diuision shall signifie. 10. digrees. Then placing th'one ende of your compasse in A. extende, or stretch out th'other vnto euery of these diuisions, & drawe arkes, or portions of circles, from th'arck A.B. vnto th'arck A.C. These ended, you shall write in euery diuision from B. to C. th'equinoctiall, vnto A. the Pole Arctik 1.2.3.4.5. or 5.10.15.20: or 10.20.30. according to the diuision of the meridiane line. After you shall accompt in this diuision 23. digrees. 28. minutes from the quinoctiall, which is the sonnes greatest declination, and

draw

draw ther à double arke whiche shall serue for the Tropicke of Cancer, or Capricorne, noted with E L, & in like manner accompt.23.degrees.28.minutes from the North or South pole, & in that space draw in like sort à double arke, which shalbe in stead of the polary circle, either Arctike or Antarctike, & set th'endes of it. F K. and so are all the paralleles of latitude, (answering your mappe) perfaitly finished.

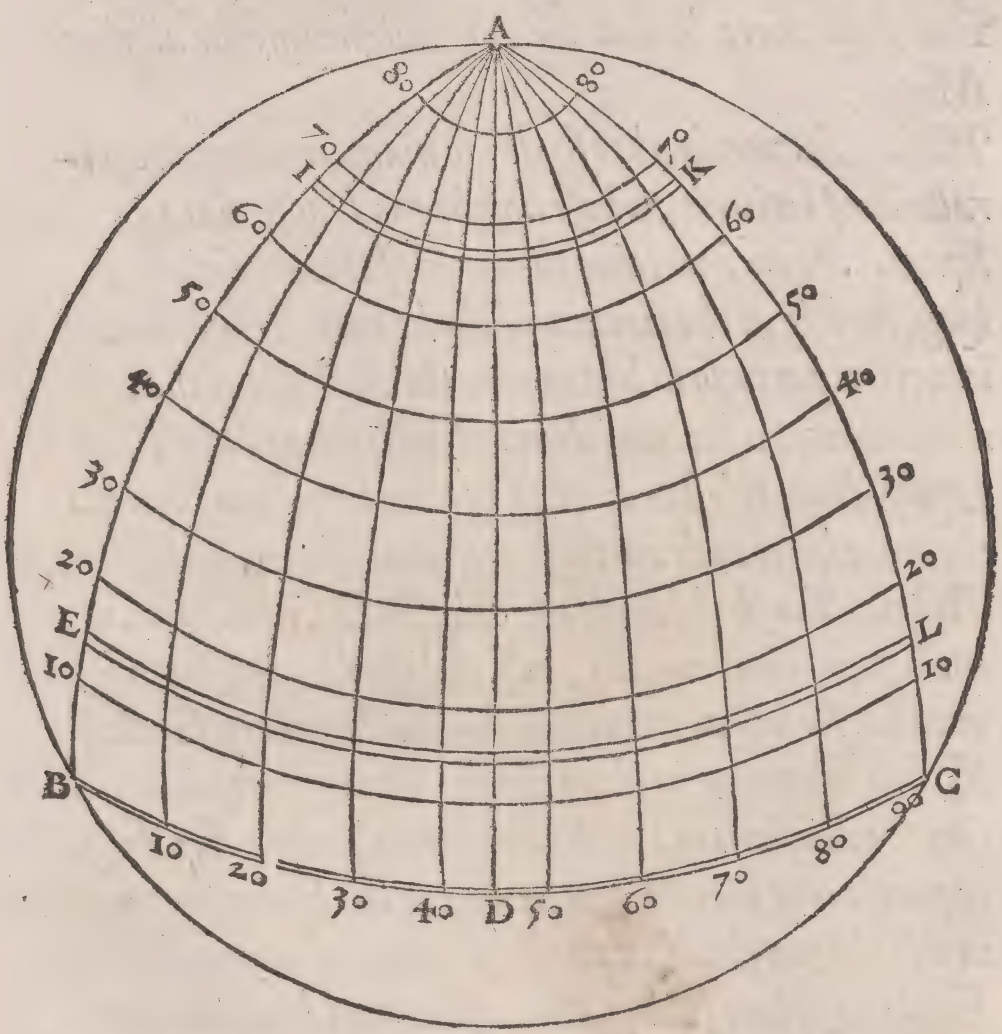
Spou. *I vnderstand the protracture of them very wel. But shall there be but one Meridiane line for all thys Mappe?*

Phil. *Yes verely, ther shalbe so many, as there are paralleles of latitude, whose nombre as I saide was.90.*

Spou. *Now I perceiue the reaso of this artificial working, for like as the circuite of the heauens is distributed into.360.parts: so in like maner the compasse of th'earth is also into 360 portions deuided, both toward the Poles & also from West to East. Therfore I pray you shew me the waye howe to draw these meridiane lines.*

Philo. *You shal deuide the arke B D C into.90.or.18. or els 9.portions equally, as F did the latitude from A vnto D. In like sort you shall deuide the polary Circle. F K. then drawinge in these diuisions from th'equinoctiall (by the diuisions of the Polary Circle) vnto A, Arkes or portions of Circles, you shal haue the frame preparid in whiche you shall (in the same maner that you did for England) place such portion of the world, as it can aptly receiue.*

Spo. *But may I not describe here the paralleles, & climates (taking thē out of the table in the second boke) as Ptolomæus doth in his Geographie?* Phi. *Yes verely, & it shall adorne the mappe, not omitting the principall windes seruing for that part of th'earth, nor yet th'inhabitāts called for the diuersitie of shadows, Periscij, Heteroscij, Amphiscij, but nowe beholde the frame of whose composition we haue made so manye wordes.*



Spou. *This mappe doth liuely expresse your meaning so that ther is none (I suppose) so ignorāt or dul, but that without*

without great difficultie he may practise the like, & ther fore I require you procede in the descriptiõ of à Card, for halfe the face of th' Earth whiche (as I coniecture) wyll conueniently serue for our Hemisphere.

Philo. *Not for our Hemispere onely, but also for any one halfe portion of th' earth, as well seruing th' vse of thẽ that dwell vnder vs directly (& called therfore Antipodes) as also any other. But I will leaue to speake of th' vse of it, because of it self it is manifest, & wil make plain vn to you the cõposition, & artificial præparatiõ of it. First with your cõpase describe à Circle as great as your carde shalbe, withi which draw an other Circle, à finger bredth distant, & iust to this, also an other. Then part these Circles in the middes with à right lyne, th' endes of which ar A.C. crosse this lyne in the middes, with an other ryghte line B.D. So is your Circle parted into 4. equal portions Then deuide euery portion in the cõpasse of the circle into 90. partes in this maner. First into 3. then euery of thẽ againe into 3. after into 2. & laste into 5. After write in them 5.10.15.20.25.30. &c, frõ B. C. vnto D A. & so is the whole cõpasse of your card, parted into 360. portions.*

Spoud. *Vnto what vse serueth the crosse lines drawen thorow the face of the Mappe?* Philo. *The line A.C. repræsenteth the meridiane: as the line B.D. The halfe Æquinoctiall circle. Also A.C. repræsenteth the Poles of the world, & the plages, or partes of the same, north & south: as B. signifieth the weast, & D. th' East.*

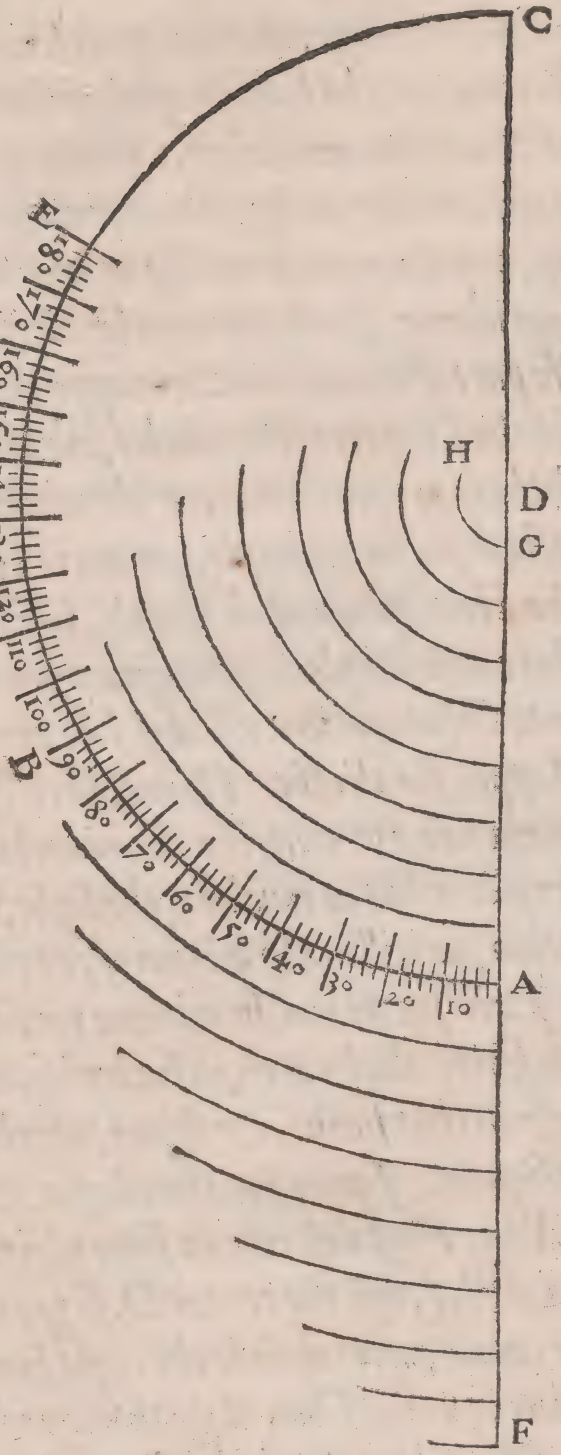
Spou. *I perceiue your minde, therfore procede.* Phi. *Thẽ applie the ruler to the digr. of the circle of A.B.C*

& note th'interſections of the ruler in th' Æquinoctiall & in like maner do in th'other halfe Circle A.D.C. this ended, you ſhall deſcribe from A. vnto C. Paralleles, or halfe circles, by theſe diuiſions in th' Equinoctiall: then write on them from B. to D. 10. 20. 30. 40. &c. Alſo you ſhall apply the ruler to the circle, diuiding the Meridiane line A.C. as you did th'equinoctial B.D. & deſcribe in th'interfectiõs in like maner, halfe circles, which ſhall ſerue for Paralleles of Latitude. Then accompte in the

circle

circle from B. toward A. xxiij. digr. 28. min. & describe an arcke, which shall repræsent the halfe tropick of Cancer, also frõ A. toward B. accõpte xxiij. digr. 28. min. & draw with your compasse another arcke, which shall signifie the halfe Articke, or polary circle: in like maner do with the tropike of Capricorne, & th' Antarticke circle. After place the halfe part of th' earth in the mappe thus præpared, & describe the Climates, Paralleles, inhabitaũts, & winds, with theyr proper names, & the mappe shalbe perfaitlye finished, as for example, you maye beholde the frame of the Hemisphere of th' Earth, before placed. Spou. This carde should seme to giue à great light & knowledge vnto Nauigation. And if I do præpare me an other Mappe, for th' other Hemisphere, I shall in these two cõpræhende, & conteine th' vniuersall Earth. Phil. Trew it is. but as touching the light, it bringeth to Nauigation, we will make mẽtion of, at our next meting: & now I will shewe you, how in one carde, or Mappe, you may describe all th' earth, in such wise, as shalbe most perfait, & in that forme, & figure, whiche shalbe right pleasant. Spou. I pray you then begin, & I shall giue diligence. Phi. First describe on some plaine place, an halfe circle A. B. C. vpõ the center D. so great as thou wilte haue the carde, after deuide the right lyne A. D. into 90, portions equally. Then place th' one ende of your compasse in A. stretching forth th' other ende vnto 86. degr. xv. min. & xx, secondes, in the line A. D. & so with your Compasse, draw an arke frõ D. vnto the halfe circle A. B. C. whiche shall crosse it in B, (for by

The making of a Carde conteininge the whole Earthe.



this way th'arke A. B. being extended right forth, shalbe as long as the right line A.D.) Then you shal diuide this arke A.B. into 90. equal partes. After with your compasse take the quãtitie of th'arke A.B. and placing th'one ende in B. take the lyke quãtitie in the half circle towardes C. whiche in like maner you shal diuide into 90. portiõs, & so th'arke A.B E shalbe parted into 180. parts. Again with thy compasse take the lengthe of the line A.D. & th'one ende beynge placed in A. take the lyke proportion from A. to F. so that A.F. shalbe equall to the line A.D. Then diuide the line A.F. into 90. partes equally, as you did A.D. after placing th'one

of

fote of thy cõpaſſe in the Cẽter D. thou ſhalt draw arkes in euery of the diuiſiõs, or els euery fift, or x. diuiſion onlye & note the hieſt Arke nexte with G. H. then enter into the table folowing, & find out how many degrees in lõgitude anſwereth to. 80. degrees of latitude, north frõ th'equinoctiall (which in the table are. 140. degrees. 40 minutes) that number you ſhal accompt in the half circle from A, vnto E. & applying your ruler vnto th'end of this nõber, & vnto the cẽter D. drawà ſhort line, whiche ſhal extẽd vnto H. again enter into your table with 70. degrees of Latitude, & you ſhall finde. 138. degrees 23. minutes (which I accompt from A, toward E as before, & applying my ruler to the ſhorte line, & the degrees in Longitude, with my pen I draw an other ſhorte line. In like maner I do with th'other paralleles of Latitude. 60. 50. 40. 30. 20. 10. Spou. *So that by entringe into the table, & accompting the degrees in Longitude frõ A. towardes E, & drawing ſhort lines one at th'end of an other, ther ariſeth as it wer a portion of a circle frõ D to B. & if I could in like maner find the proportiõ of th'equinoctiall vnto the South paralleles (whiche in like nõbre are. 90.) thẽ the whole forme wolde repræſent the figure of half an hart.* Phi. *Th'other parte of the Table conteining Southe paralleles, ſhall ſerue herein your vſe ſufficiẽtly. For entring into it with. x. degrees of latitude which is the next ſouth parallele frõ th'equinoctial, I find. 79. degrees. 46. min. which accompting as before in the halfe circle A E. I drawe an other ſhorte line at th'end of th'other, & ſo in like ſorte with. 20. 30. 40. 50.*

A TABLE, CONTENING THE SEGMENTES

and partes of th'equinoctiall, drawne in a plaine plat forme, answering vnto the circumference of Paralleles. &c.

The North Latitude of Paralleles						Paralleles drawen South frō th'Equinoctial					
Di	Dig	M.	Di	Dig	40	Di.	Di	Mi	Di	Di	Miunt.
89	141	20	44	126	40	1	88	59	46	41	22
88	141	20	43	126	2	2	87	59	47	40	19
87	141	19	42	125	22	3	86	58	48	39	16
86	141	16	41	124	44	4	85	59	49	38	12
85	141	12	40	124	4	5	84	53	50	37	8
84	141	7	39	123	16	6	83	55	51	36	4
83	141	1	38	122	44	7	82	52	52	35	0
82	140	55	37	122	4	8	81	51	53	33	56
81	140	47	36	121	20	9	80	17	54	32	53
80	140	40	35	120	38	10	79	46	55	32	2
79	140	27	34	119	55	11	78	44	56	31	2
78	140	22	33	119	10	12	77	41	57	30	0
77	140	4	32	118	55	13	76	38	58	29	0
76	139	58	31	117	41	14	75	33	59	28	5
75	139	46	30	116	58	15	74	31	60	27	0
74	139	30	29	116	9	16	73	27	61	26	1
73	139	14	28	115	21	17	72	25	62	25	2
72	138	45	27	114	33	18	71	19	63	24	2
71	138	38	26	113	45	19	70	16	64	23	3
70	138	23	25	112	56	20	69	12	65	22	5
69	138	13	24	112	6	21	68	7	66	21	6
68	137	56	23	111	17	22	67	3	67	20	9
67	137	32	22	100	27	23	65	50	68	19	12
66	137	15	21	109	35	24	64	55	69	18	16
65	136	55	20	108	55	25	63	50	70	17	20
64	136	33	19	107	52	26	62	45	71	16	23
63	136	10	18	106	58	27	61	40	72	15	27
62	135	47	17	106	9	28	60	36	73	14	31
61	135	25	16	105	13	29	59	32	74	13	37
60	135	0	15	104	19	30	58	41	75	12	43
59	134	35	14	103	22	31	57	23	76	11	49
58	134	6	13	102	29	32	56	18	77	10	55
57	133	41	12	101	34	33	55	13	78	10	1
56	133	12	11	100	39	34	54	8	79	9	8
55	132	43	10	99	42	35	53	5	80	8	17
54	132	15	9	98	45	36	52	0	81	7	26
53	131	48	8	97	49	37	50	55	82	6	35
52	131	16	7	96	51	38	49	51	83	5	44
51	130	44	6	95	53	39	48	44	84	4	55
50	130	10	5	94	52	40	47	43	85	4	2
49	129	37	4	93	58	41	46	39	86	3	13
48	129	2	3	92	58	42	45	34	87	2	24
47	128	29	2	91	58	43	44	31	88	1	35
46	127	52	1	91	0	44	43	28	89	0	47
45	127	16	0	90	0	45	42	25	90	0	0

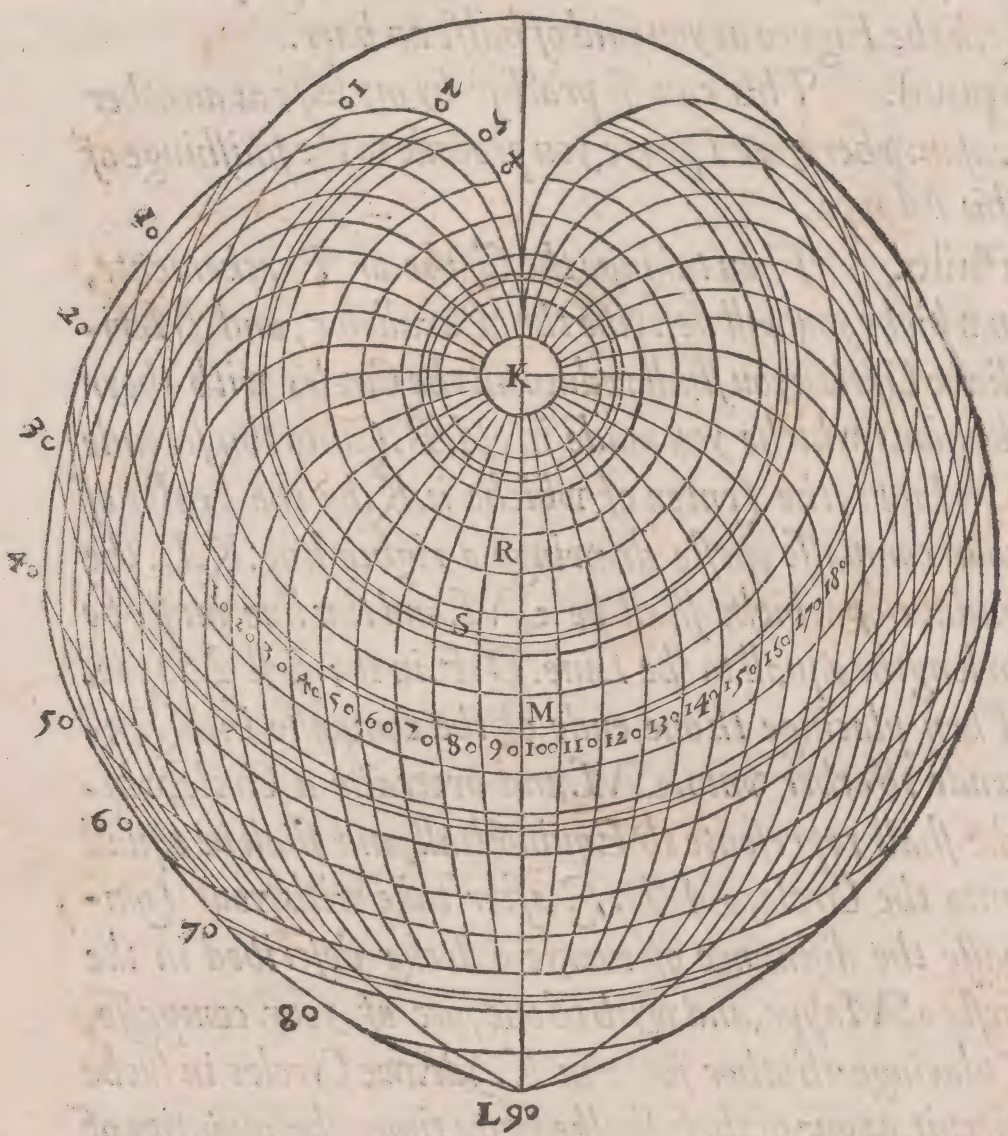
60.70.80.90.where the Pole Antarctike is,and maketh the Figure as you ſaid of halfe an hart.

Spoud. This can I practiſe by my ſelfe at an other ſeaſon:wherefore I praye you procede to the finiſhinge of this Mappe.

Philo. Then takinge the Clothe or Parchemente, in whiche you will deſcribe the Paralleles, and Meridiane Circles:you ſhall reduce all the Circles with theyr diuiſions,whiche you made in A.B.C.into this ſeconde Mappe,the Center of whiche is.K.by the healpe of your compaſſe,firſte drawinge a righte line.K.L. the middes of whiche ſhall be M.and this line muſte be in lengthe equall to the Line.D.F.in the firſt Mappe. Then placinge th'one ende of the compaſſe in.K. extende th'other vnto.M.and protracte a Circle,whiche ſhall repreſente th'Equinoctiall,and ſhall be equall vnto the Circle. A.B. C. after take with your Compaſſe the diſtaunce of euerye Arcke deſcribed in the firſte Mappe,and wyth th'one fote of your compaſſe, (placinge th'other foote in.K.)drawe Cyrcles in ſuche circuit,as one of theſe ſhalbe foure times the quantity of one of th'other in the firſte Mappe.

Moreouer you ſhall diuide th'Equinoctiall line into,360.equall portions,ſuche as are in the Line.A. B.C.In like ſorte th'other Paralleles,bothe Septemtrionall,and Southe from th'Equinoctiall, and drawinge from euerye diuiſion of one Parallele vnto an other ſhort lynes as you did from.D.to.H.in the firſte Mappe.

your



your Carde will not onlye growe to the forme of a harte, but alſo of a double herte one within an other, as thys demonſtratiõ, & figure ſheweth. Laſt you ſhal drawe the Tropickes of Cancer and Capricorny, the Circles Arcticke and Antarctike, makinge them double lines for the eaſier knowinge them from th'other paralleles.

Then

Then place in thys Mappe the Face of th' Earthe, accordinge to his partes in Longitude and Latitude, as it is set fourth in my fifth booke, vsinge in euery Countrye, to place onlye the Meridiane Line, for the middes of the same, where as your Mappe is of no greate quantitye. Then place the degrees of Longitude, & Latitude vnto the Paralleles, and Meridiane Circles, with Climates, Windes, diuersity of inhabitaunce, and other necessarye thynges.

Spoud. *But maye I not describe the Planet & signe vnder whiche euerye nation is, also in this Mappe? for Ptolomæus maketh mention of them in his quadripartite, as also euery Astronomer wryting of the reuolutiõs of the world.* Phi. *Yes truely, & by that reason, you shall make it an Astronomical Glasse also, & serue your vse profitablye therein.* Spoud. *I praye you geue me a table of the principall windes, of whiche you haue hetherto made no mention, & also of the Planets & signes, vnder whome euery region & Country is gouerned.*

Phi. *As touchinge the windes, and there nombre, because it requireth a longer time then now is offered, you shall finde in the table of thẽ where we make mention of Nauigatiõ: but as for the Planets & signes gouerning euery region, because you haue not alway Ptolomæus, I will not refuse to make mentiõ of it in this place, adding furdermore vnto Ptolomæus the names both of Regions, and Cities, which ether were not knowne of hym, or els willingly omitted. As in this Table you maye easelye perceiue, cõferrig it with that which is of him described.*

Regions and Cities, subiect to the signes & Planets, and first of those that be vnder Aries,

♈.♂ and Mars.

Basternia, Syria, Palestina, England, Fraunce, Germany, Burgundie, Sweueland: and of Cities wyth Townes, Naples, Ancona, Ferrariæ, Florens, Verona Capua, Lindauia, Cracouia. &c.

♉.♀ Vnder Taurus, and Venus.

Parthia, Media, Cyprus, the lesser Asia, th'Ilandes named Cyclades, Frelande, Heluetia. &c. Of Cities and townes, Bonony, Tigure, Lucerna, Herbipolis, Lipsia, Posna. &c.

♊.☿ Vnder Gemini, and Mercurius.

Hircania, Armenia, Cyrene, Marmarica, the lower Ægipt, à part of Lombardie and Flāders, Brabant: and of Cities and Townes, London, Louain, Brigys, Mence, Hasford, Norinberge. &c.

♋.☽ Vnder Cancer, and the Mone.

Numidia, Africa, Bithynia, Carthage, Phrigia, Hollande, Seland, Scotland, the kingdome of Granat. &c: And of Cities & Townes, Constantinople, Venice, pise, Millan, Treuers, York, S. Andrews, Lubeck.

Vnder Leo, and the sonne.

♌.☉ Italy, Sicilie Apulie, Boheme, Phænicia, à part of Turkie, Sabina. &c. And of Cities with townes, Damascus. Rome, Confluence, Rauenna, Cremona. Prage.

Vnder Virgo, and Mercurius.

♍.☿ Mesopotamia, Babilon, Assiria, Grece, Achaia Crete: and of Cities and of townes, Hierusalē, Corinth,

the

Rhodes, Papia, Toloſe, Lions, Paryce, Heydelberge, Baſile. *Vnder Libra, & Venus.* ♎.♀

Bactriana, Caſpia, Thebaida, Æthiopia, Lyuonia, Auſtrige, Oaſis. And of cities & towns, Caiëta, Lauda, Sueſſa, Placentia, Friburge, Argentine, Spiers, Francford. &c. *Vnder Scorpius and Mars.* ♏.♂

Iudæa, Cappadocia, Getulia, Mauritania, Norway, Cathalonia. And of Cities and Townes, Valentia, Padua, Meßana, Aquileia. &c.

Vnder Sagittarius, & Libra. ♐.♎

Spayne, Arabia the happy, Vngary, Slauonia, Celtica, Miſnia. And of Cities & Townes, Tolet, Collein, Narbona, Stutgardia, Rotenburge, Buda. &c.

Vnder Capricornus, & Saturnus. ♑.♄

India, Arriana, Macedonia, Thracia, Grece, Saxonye, Heßia, Orchney Flands, Machline, Oxford, Brãdenburge, Conſtantia, Fauentia. Auguſta vindel. &c.

Vnder Aquarius, & Saturne. ♒.♄

Arabie deſert, great Tartarie, Denmark, Segdiana, Sarmatia. & of Cities, Hamburge, Brema, Saliſburge. &c. *Vnder Piſces & Iubiter.* ♓.♃

Lydia, Pãphylia, Calabria, Normandy, Portugal Sicilie. & of cities & townes, Alexãder. Hiſpalis, Copoſtel, Ratiſbone, Worms. Sp. *Ther now remaineth to ſpeke of the deſcribing à perticuler card for any regiõ or coũtry, without knowinge their lõgitudes & latitudes.* Ph. *That is well remẽbred, & ther be diuers, & ſodri waies to performe this work, of which I wil ſhew you but one: that is by an inſtrumẽt, ſeruing properly to this vſe.*

But like as this waie is more easier then that whiche is performed by longitude, & Latitude, & may be put in practice at all times: so in like condition, the worcke is not so exacte, and perfaite, as by Longitudes and Latitudes, whiche require longe and diligent obseruation.

Spou. *In what form is th'instrumẽt made by which so much vtilitie may spring, as to describe by it, a country.*

Philonicus. *It is made muche like the backe parte of an Astrolabe, conteininge in the circuite. 360. de-*

An Instrument seruinge th'vse to describe a coũtrey

grees

grees, and hathe à ruler with two sightes, whiche we moue to and fro, as occasion is ministred, vntill thorowe them we see the place desired. But it differeth from an Astrolabe, in that it hath à Diall, with à Nedle fixed in it, & also that th' Instrument is diuided into two & thirtie partes, like as à Shipmans compasse. As this figure before placed, doth apparantly set out.

Spoudeus. This Instrument is easye to be prouided, yea, & that without great expence, & is not troublous in cariage: but in what sorte may I by it describe à Country?

To make a Carte without knowing Lõgitude, & Latitude.

Philon. I will in fewe wordes make it to you euident. With youre Instrumente you shall ascende on some hie towre, Steaple, or Mountayne, so that you may on euery part se the townes, & Villagies, aboute you adiacent in your Horizont. Then placing your Instrument (which I name à Geographicall plaine Sphere) Flat, & leuell, tourninge it from one parte vnto an other, vntil the nedle fall on the Meridian Line, in thy Geographicall plaine Spheare, then it remaininge stedfaste: directe the ruler with hys two sightes vnto anye one place that you do see, & marke diligently th' Angle of sight, (Gemma Frisius calleth it) Angulus positionis.

The Geographicall plaine Sphere.

Th' Angle of sight.

Spoude. I praye you be not offended althoughe at thys presente I interrupte you, and or you further procede shewe me what you call the Angle of sight.

Philonicus. I am nothynge displeased, but muche reioyse that you will not negligentlye suffer

thinges to escape you, vntill you be satisfied touchinge their true meaninge. You shall note that the Angle of sighte, is that Arke or portion of the Horizont of anye place, comprehended betwixte two Meridiane Circles and drawne by the verticall Circle of the first place, vnto the Meridian of the secõde, whose distaunce you seke out. Spou. Then you in this place call that Arke of the Horizont, the Angle of sighte, whiche is lesser then à perfait angle, conteininge. 90. degrees.

Th' Angle of sight.

A perfit Angle.

Phil. I do so, for if it be. 90. degrees, the place is vnder the same Parallele of Latitude, but yet differeth in Longitude, & therefore is directly East or West, as also if there be no Angle of sighte, it hathe the same Longitude & meridiane Line, & is plaine North or South from you.

Spoud. Then I pray you proceade with your precept, you saye I shall take the Angles of sight of euerye place that I can see in the Horizont of my place where I begin my worke.

Phil. Yea verelye, and then you shall make in some Paper à greate Circle, & deuide it into. 360 partes, as your Geographicall plaine Sphere is, writinge the foure coastes of the countrey East, South, West, & North, in your paper, then draw right lines frõ the Center of your circle, (whiche representeth your place where you take th' Angles of sight of other townes, & villagies adiacẽt) vnto suche Angles of sighte as you haue founde oute by your Geographicall plain Sphere.

Spou. But this shall litle (as I cõiecture) auayle: yea al-

althoughe I might haue th' Angles of ſight of all the places in à Regiõ, from my place, if I haue not the trewe diſtaunce of them?

Philon. *I cõfeſſe no leſſe: for if you haue not th' Angles of ſighte from ij. places, you can not gather the diſtaunce of the thirde. Therfore when as you haue placed in the Paper all the Townes, Villages, or notable hils, that you can ſe in that Horizont: you ſhall take your inſtrument and Paper, trauelinge vnto ſome other town, where in like manner you ſhall go vp into the hieſt place of the ſame, and there placinge your inſtrumente as before, obſerue th' Angles of ſight of ſuch Townes & Villagies as are in that Horizont. Whiche ended, you ſhall deſcribe in the Paper an other circle as before (as farre diſtaunte frõ th'other, as you thinke conueniente, marking diligentlye that the Center of the ſecond Circle, be in the line of ſighte, drawne from the Center of the firſte Circle, it beinge alſo deuided into. 360. partes) drawing ſuch Angles of ſight as you can finde. And ſo procede frõ place to place, vntil euery Towne or Village haue come twiſe in your ſight. And where that anye line of the ſeconde Circle, Croſſeth the like line in the firſte Circle, make there a Sterre, or like marke, for that thirde place (ſo call I the towne obſerued twiſe) & ſo in like manner you ſhall do with other places, vntil you haue drawn the hole region you deſire.*

Spoud. *Than it is expediente for me to obſerue the Angle of ſighte of euerye Towne, from ij. ſeueral places, ſo ſhall I finde oute the diſtaunce of one of them from an*

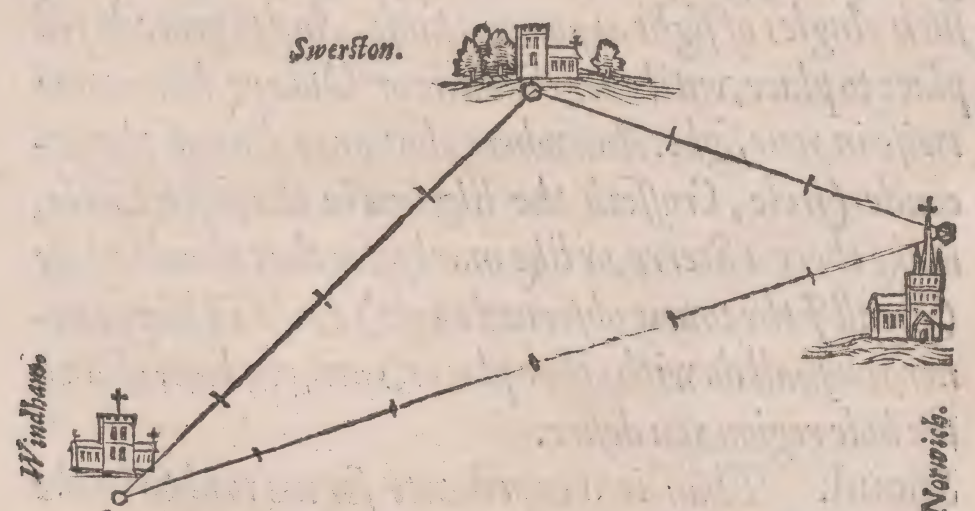
other, or of the thirde frō thē both, as it muſt be placed in the Card. Phil. Yea, and not only in the Card, but that being knowen, you ſhall eaſely finde out the diſtaunce in miles of one of them from an other.

To finde the diſtaunce in miles of diuers places.

Spou. That ſemeth very meruelous, ſeyng that you haue not theyr Longitudes & Latitudes.

Phil. Yet the worke is right eaſie) as I doubte not but you will confeſſe) for knowing the diſtaunce in miles of anye Townes, or Villagies, you ſhall knowe the true diſtaunce of all the Townes in an Region, one from an other, as for example.

Swarſton in Norfolk, is from Norwich. iij. miles: I deuide as you ſe the line drawne from Norwiche to it with my compaſſe, in three equall parts, & after applye my compaſſe to the line drawne frō Norwich to Windham, & from Windham to Swarſton, & find. vi. miles betwixt Norwich and Windham, and. iiij. miles from Windā to Swarſton. Spo. By this way, I can finde



out the diſtaūce of two townes nie together, & by that to finde out the diſtaūce of all townes in à Carde.

Philo.

Phi. *I do greatly commend you, and you may also make a scale, or ruler, conteininge in it the quantitye of miles from one, to an hundreth if you please, and by this menes you may take with your compasse the distance of ij. places, & then apply the compasse to the foresaide scale, or ruler, & you shall finde the perfaite distance. And nowe sence I haue fulfilled your mind for the chief & principall matters beloging to Cosmographie, & Geographie, I will at this present returne to my lodginge againe.*

Howe to finde the distaunce of places.

Spou. *Whan shall it be your pleasure, that I shall repaire vnto you to be instructed in the Terestriall Globe, because you saide that it do mooste aptlye represente the forme of th' Earthe.*

Philo. *Being required by certain of my frendes, I do entend, to make a longer & more ample discourse therin, then this place will permit: And therfore will at thys time omit it. As touching my fift booke you shall receiue it of me to morrow, which day also for your furderaunce, I entende to consume in teaching you necessarye principles for Hydrographie and Nauigation. And therefore agayne fare you well.*

THE FOVRTH BOOKE OF

the Cosmographicall Glasse, setting out such necessary principles, & rules, as are to be obserued in Hydrographie, & Nauigation.

Spoudæus.

Time tedious.

THERE IS NOthing vnder the Globe of the mone conteined, whiche vnto man, beast & euerye liuinge wite, semeth more tedious, more ickesome, and long thē time, when as they once fele the wante of that they moste desire. Whiche sayinge to be true (althoughe manye do confesse) yet I aboue all other muste of force affirme, remembringe your promesse, touchinge th' Arte of Nauigation. For sence your departure, the greadye Greyhounde (I assure you) neuer more desired his pray, nor the thirstye harte, the flowynge fountaine, or the languishinge sicke paciente, the recouery of his health: then my minde wanting her fode and Nutrimente, thoughte longe, wished, and thirsted, after youre presence and companye.

Phi. It is the proper nature of suche in whose mynde knoweledge haue once builded her Boure, euer more & more (like à couetous mā) to labour & trauell after

sciēce

ſcięce: for ther is no other waies, how to expel that foule, & vglie beaſt Ignorance, out of the minde of mā: & to place knowledge in the ſame, but by all poßible meanes, to imbrace Scięce & Cunning. Wherfore, leſt that your paine ſhould with Tantalus increaſe: I wil no lenger occupie the time with other kinde of talke, but will begin ſomwhat to intreat of neceſſary thinges belōging to Nauigatiō: for I do not intende to ſet out the differēs of one veſſell frō an other, as th' Argouſie, Hulke, Ship, Craer, Pincke, Pynice, Gally, or what ſo euer name they haue, nor yet of theyr takling: but wil leaue it to ſuch as are Pilotes & maſters of that facultie, & will ſhew thē à way how they ſhall both correcte their errours, & alſo guide & direct their Veſſels, accordiug t' Arte & Science.

Spo. *Thē firſt I pray you begin with the diuiſiō of the water, expoūding ſuch names as they take of ther place.*

Phi. *That was my meaning: & firſt as touching the ſeas you ſhal note that it is diuerſly called: either according to the hole, or els accordig to the part. Accordig to the hole, as the ſeas by this generall name Oceā, becauſe they circuit th' earth roūde about. according to thē partes, as the ſeas breaking into the land, & making bācks on either ſide is called Sinus, takinge alſo the name of the place it floweth into, as Sinus Adriaticus, ſinus Arabicus, Sinus Indicus &c. Alſo the great ſeas which diuideth Afrik & Europe, is called the midle erth ſea: taking that name becauſe in the Weaſt of Spaine, it breaketh into the middes of th' Earth. The Redde ſeas where proud Pharo & all his bende were drenched: is not farre diſtante from*

Th' Ocean ſea

Sinus, what it here ſignifieth

Mare mediterranium.

The red Seas.

Mare Mortuum.

from the midde Earthe Seas, for there is but à certayne hyll, whiche they muſt nedes go ouer that go by land frō Egipte to Arabia Petrea, that parketh them. Alſo the Sodomiticall or dead Seas (ſo called becauſe that Sodōe & other Cities were there burnt with fire coming from heauen) is not farre from Iordane, it is alſo called the dead ſea, becauſe the water moueth not, no not with moſt vehement tempeſtes, becauſe of the pitch in it, nether cā any ſhippe ſaile, or any fiſhe liue there.

Mare Congelatum.

The ſeas whyche are vnder the Poles Arcticke & Antarcticke are called the congeled or froſen Seas. There are alſo the Engliſh, Germaine, Spaniſhe & other ſeas, of whiche I neade to make no mention, no more then of the notable riuers, as the Themes, the Rhine, Confluence, Neccarus, Danubie, Tyber, Nilus. &c. Becauſe they are manifeſt vnto ſuche as trauell in any of them.

Spoud. *I read alſo in diuerſe writers theſe wordes, Fretum, Lacus, Stagnum, Palus, Fluuius. But theyr difference I know not.*

What Fretum is.

Phil. *Fretum is cōtrary to that peaſe of th' Earth, that is called Iſthmus. For like as that is â ſtreight portion of th' Earth, hauinge the Seas on bothe ſides: ſo Fretum is à narrowe & ſtreit arme of the Seas, beyng betwixte two ſhores.*

What Lacus is.

Lacus, & we may call it à lake, is that which cōtinually hath water.

What Stagnum is.

Stagnum do differ from it, becauſe it conteyneth only water gathered by inundations, and raine in the winter ſeaſon.

What Palus is

Palus is à water merueilus deape, & broade, & Fluius, we name it à fludde, & is called ſo of flowyng.

Spou.

Spoud. *Your wordes giueth me occation to demaunde the cause of ebbing, & flowing, & also whether the time may by any meane be learned?*

Philon. *And I will gladly answere you, for this is not the least thing that Pilotes, & Shipmen ought to haue regarde vnto, bothe for goyng out, & also comminge in into any Porte, or Hauen, & other necessarye matters. & as touchinge the Seas howe that they raise, and Eleuate vp them selues, as though they would touch the firmament, and there with filleth other Armes, Hauens, and waters: and also, that they waxe shallowe, and as it were emptye againe: I can coniecture no other cause then that, which the Noble Philosopher & Phisitian Galenus citith, in his boke De diebus decretorijs: in which he affirmeth that whē as the Mone increse in light, al moist thinges in like case increase: & when as her light decreaseth, they in like sort decrease. Wherby it is euident that spring, & ebbe tides, take their beginning & end of the mones course in the Zodiack. Galenus words are these.*

The cause of spring & ebbe tides.

Πάντα μὲν γὰρ ἃ δρᾶν πέφυκεν, ἄμυδρα γίνεται μηνοειδῶς γενομένης αὐτης, ἅπαντα δὲ ἴσχυρα πεπληρωμένης.

Li. 3. de Dieb. decret. cap. 2.

Omnia siquidem quæ facere nata est, vbi falcis figurā repræsentat languida fiunt: inualescunt omnia cum plena fuerit.

All thinges which are vnder the power of the Moone, when as she resembleth the sith in likenes, they are feble, & decrease: but al thinges waxe & increase, when she is at the Full.

Spou. *Then by these wordes I gather à repugnancie betwixt his authoritie, & dayly experience: for it is more manifest, & clere thē midday, how that the seas ebbe, & flow euery natural day, that is in 24. houres*

An obiection.

twise: & Galenus saith, how but twise in à Month the Seas ebbe & flow: for because she is but once at the full, & once at the chaunge in this circuit of time.

Th'answere. Phi. This obiection nothing infringeth Galen his authoritie, nor yet experience. For in the spring, and ebbe tides, the seas do encrease, & decrese meruelously: whiche happen but twise euery mõth, & this is that, which Galen ment. And as for daily ebbing, & flowinge, the seas do not increase, or decrease therwith. And therfore is properlye called fluxus, et refluxus, but th'other Augmentum et Decrementum maris.

Spo. And what is the cause of this dailye ebbinge and flowinge so orderlye, as often & sundrye times I haue well noted?

The cause of Ebbyng and flowing. Phi. The mone also, for when as she riseth in th'East, the seas begin to increase more & more, vntill she commeth to the Meridian Circle, & is full Southe: & then causeth full Sea. And so as she declineth from the South, so the sea decrease, vntill she go downe in the Weast Ocean, at whiche time againe the Seas begin to increase, vntill the Moone be in the foresaide Meridian Line, vnder th'earth, & then she is full North, making also full seas. So they decrease by little & little as the Mone aprocheth toward th'East.

Spou. Then I praye you teache me some briefe waye how I maye at all times finde th'age of the Mone without anye tables of her diurnall course, or Ephemerides: for hauing that, I shall easlye finde oute the springe and ebbe tides.

Philo-

Philon. *With à right good will, you shall accompt the daies, that are past of thy month, & adde thereto the Epacte, And to this number you shall also adde for euerye month past (beginning at Marche) 1. These 3, numbers you shall adde together, and that shall shew you the age of the Mone. As for example 1559, the 24. daye of Auguste, I wolde knowe the mones age. Firste I adde 24 daies to th' Epact which is 22, the number of them is 46, then from March to Auguste, ther are 5. Monthes past, therfore I adde to 46. the number of 5. and the hole number is fiftie one, from whiche I take thirtie, (for so muste you do, if your number be more then xxx. & vnder sixtie) & there remaine, one & twentie, which is th' age of the Mone.*

How at all tymes to finde th' age of the Moone.

An example.

Spoud. *And what if the number be 30. or 60. what muste I then do?*

Philonicus. *There is no thing to do, for that number sheweth the Moone to chaunge that presente daye.*

Spoude. *And howe may I finde the trewe Epacte, for on that is all the difficulte of the worke?*

Philon. *That is so easie, as I counte it but loste time to make many wordes there in. For hauinge th' Epacte for one yeare: you shal for the next yeare adde xi. & so yerelie xi. & caste awaye xxx. as ofte as you can: & the remnent, shalbe youre Epacte. But because I will not make more wordes in trifles, beholde the Table, and whan the yeares are expired, begin againe at the firste numbre, & so continew for euer without variation.*

Th' Epacte.

The yere of Christ	The gol dē num.	Th'E pacte	The yere of Christ	The gol dē num	Th'E pacte
1560	3	3	1570	13	23
1561	4	14	1570	14	4
1562	5	25	1572	15	15
1563	6	6	1573	16	26
1564	7	17	1574	17	7
1565	8	28	1575	18	18
1566	9	9	1576	19	29
1567	10	20	1577	1	11
1568	11	1	1578	2	22
1569	12	12			

Spou. *Nowe if I coulde know, howe long the Moone doth euery night shine, me thinke it should be very pleasaunt & comfortable, especially beyng on the troublous seas.* Philoni. *And to that thinge also, you shall easely attaine by the helpe of the Table folowing.*

A TABLE OF THE SONNE RISINGE and going downe, throughe the whole yeare.

	Ianuarius.				Februarius.				Martius.				Aprill.				Maye.				Iune.			
Da. of themō	Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.	
	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.
1	7	47	4	13	7	5	4	55	6	16	5	44	5	23	0	37	4	36	7	24	4	7	7	53
5	7	42	4	18	6	59	5	1	6	9	5	51	5	16	6	44	4	31	7	29	4	5	7	55
10	7	36	4	24	6	50	5	10	6	0	6	0	5	8	6	52	4	25	7	35	4	4	7	56
15	7	30	4	30	6	42	5	18	5	51	6	9	5	0	7	0	4	19	7	41	4	4	7	56
20	7	24	4	26	6	34	5	26	5	42	6	18	4	51	7	9	4	14	7	46	4	6	7	54
25	7	17	4	43	6	24	5	36	5	34	6	26	4	43	7	17	4	11	7	49	4	9	7	51

	Iulius.				Auguſt.				September.				October.				Nouember.				December.			
Da. of the mō	Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.		Sonne rise.		Sonne go do.	
	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.	H	M.
1	4	12	7	48	4	48	7	12	5	39	6	21	6	32	5	28	7	22	4	38	7	53	4	7
5	4	15	7	45	4	55	7	5	5	46	6	14	6	39	5	21	7	28	4	32	7	55	4	5
10	4	20	7	49	5	3	6	57	5	54	6	6	6	47	5	13	7	34	4	26	7	56	4	4
15	4	26	7	34	5	11	6	49	6	4	5	56	6	55	5	5	7	40	4	20	7	55	4	5
20	4	32	7	28	5	18	6	42	6	13	5	47	7	4	4	56	7	45	4	15	7	54	4	6
25	4	38	7	22	5	26	6	34	6	21	5	39	7	12	4	48	7	49	4	11	7	51	4	9

First you shall seke out the Monthe in this table, with his day, which if it be not there expressed, take that whiche is next it. And it shall shewe you what time the sonne setteth: after, seke out th' age of the Mone by th' Epacte, or otherwise, & against that number in this table (intituled the time that the mone shineth. &c.) You shal find houres, & minutes, which adde to the going down of the sonne, & that nomber shall manifestly declare how long she is aboue th' Earthe, as for example. The .xx. daye of Marche. 1559. the Mone is xj. daies olde: against which number in the Table of hyr shining, I finde viij. houres, 48. minutes. Thē do I loke at what tyme the sonne setteth the .xx. day of March, & find it at vi. of the clocke xviij. minutes. These I adde together, and the numbre is xv. hours vi. minutes: so that the mone sheweth vnto iii. of the clocke in the morning, & vi. minutes after. & heare you muste note, that before the Full, & after the chaunge, she shineth presently, the sonne beinge set. But after the Full mone, you shall subtract oute of the sonnes rising, so many hours & minuts, as you finde in th' age of the mone: & the remanent, shal shew when as she do rise as for example. The xxvij. day of March, the moone is xviij. daies old, the time of hir shining, is x. houres xxiiij minutes: the sonne riseth that day, at v. of the clock. xxx minutes. Now subtract the shining of the Mone, out of the sonnes rising: there remaine vii. houres vi. minuts, the time whan as the Mone shall shew her selfe aboue the Horizont.

To know howe lōg the Moone doth shine euery night.

An example.

An example.

A TABLE SHEVVING HOVVE LONG the Moone ſhineth in our Horizont.

Th'age of the Mone.	The time ſhe ſhineth.		Th'age of the Mone.	The time ſhe ſhineth.	
Dayes.	Hovr.	Min.	Dayes.	Hour.	Min.
1	0	48	16	12	0
2	1	36	17	11	12
3	2	24	18	10	24
4	3	12	19	9	36
5	4	0	20	8	48
6	4	48	21	8	0
7	5	36	22	7	12
8	6	24	23	6	24
9	7	12	24	5	36
10	8	0	25	4	48
11	8	48	26	4	0
12	9	36	27	3	12
13	10	24	28	2	24
14	11	12	29	1	36
15	12	0	30	0	48

Spoudæus. *There yet remain to ſet out, at what time daily ebbing and flowing ſhalbe in euery coſt or you furder proceade: for you haue declared the diuiſion of the ſeas: with the cauſe of the ſpringe and ebbe tides, alſo of dailye ebbinge, and flowinge, moreouer, the age of the Mone, and how long ſhe ſhineth, wherby I can conieƈture the tides aforeſaid: nowe therfore if you do inſtruƈte me, wherby I may know the perfeƈt time of Ebbinge and Flowinge: then you maye with other thynges at your pleaſure proceade.*

Philon. *That you may do with out any labour or ſtudye, if you do, but only know what Mone in that coaſte make ful ſeas: which thinge this Table folowynge ſhall leade you vnto, in which, I haue placed the principall townes on this ſhore of England, & of other coſtes, with the Mone that in euerye one of them make full ſeas.*

Full

FVLL SE AS IN THESE PLACES FOlowynge by the coste of the Moone, as whan she is at

London.	S.VV.	Al the coast à long, till you come to Poell head	S.w.
Graues ende.	S.VV.S.	From Poell head til you come to the streit of Malgate.	S.w.
Poperelle.	S.	Grauelin	S.E.
Landes ende.	S.E.	Dunkerk	S.E.
Marget.	S.S.E.	Hoste Ende.	S.S.w.
Gulles.	S.VV	Blanke Borow.	S.S.w.
Sandwich	S.E.S.	Sluse.	S.s.w.
Douer.	S.E.S.	Ramkinse	s.s.w.
Rhie.	S.S.E.	At Anwerpe.	E.
Porchmouth.	S.	Newporte	s.s.w.
Portland.	S.E.	Harwich	s.s.E.
Dartmot	VV.S.	Yermouth	s.E.
Plumot	VV.S.	All the coast à longe to VVintertone.	s.E.
Famot.	VV.S.	Humber.	E.
Mous bay.	VV.	Scarborrow, and à longe the coast to Newcastell.	s.w.
Scilli.	VV.S.	Castell.	s.s.w.
Milford.	VV.S.	Holly Ilande.	s.s.w.
The lands end at Gulf.	VV.S.VV	Barwike	s.s.w.
And all the coastes vp to bristow, yea and the coastes of Irlande, frō VVaterforde, vnto Holdhēde of		South Hāpton.	S.
Kinssael.	w.S.	Blacke Deppes	S.
Calys.	S.S.E.	Redde Bancke.	S.
Boleyne.	S.S.E.	Tyne Mouth.	s.w.
Depe.	S.E.S.	Hartle Poule.	w.S.w.
New Hauen	S.E.S.	Feylene.	VV.S.
The coast of Lions.	S.s.w.		
Conquit.	S.w.		

Spo. This I vnderstande very well.

Phi. Then when you will learne the time that it shall be full sea, seke out the towne with the coast of the mone. After, enter into this table (hauiug th' age of the mone) & there stay your finger. Then seke in the hier or lower part of the Table, for suche a coast as you founde writen

How to know th' exacte time of ebbinge and flowyng.

To the Reader.

Heare should come into this Page (frendly Reader) the table of the Mones ebbinge and flowinge: but because the space is not sufficient, you shall finde it, in an open sheet, whiche must here to be annexid.

part

with your towne, and ouer againſte th'age of the Mone you ſhall haue the daye, and houre, when as in that coſte it is full ſea. As for example, I finde at Yermouthe. S. E. Wherby I ſaye that à Southeaſt Mone, make à full ſea with them: thẽ I Imagine the Mone to be. xij. dais olde therfore in the firſte rowe I ſeke th'age of the Mone, & in the hier part of the Table, find S. E: then deſcending vntill I be directly againſt th'age of the Mone, I find vi. hours. xxxvi. minutes, which is the exact time, whan as it is full ſea at Yermouthe. So in like manner you maye worke with any place, about this our Ocean ſea, as in the table goyng before it is euident. *An example.*

Spoude. *This I do right well perceiue.*

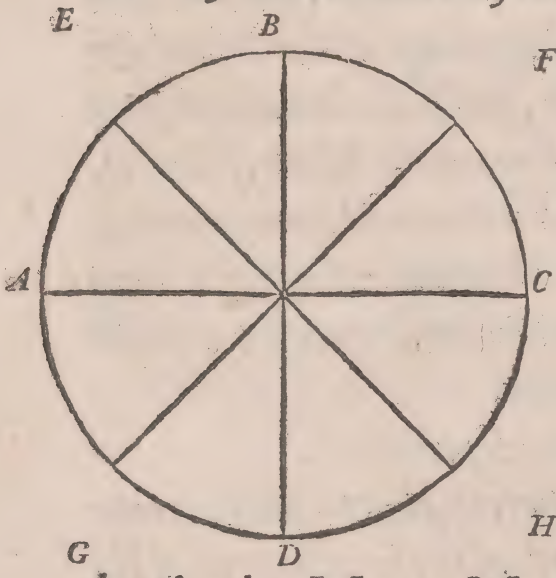
Philon. *Now order inforſeth, that we conuert oure talke vnto the windes, becauſe of the neceſſary vſe of thẽ in Nauigation, & firſt you ſhall vnderſtande that the winde is no other thing, then à hot & dry exhalatiõ, ingendred in the bowels of th'Earth, which once breaking forth, is driuen rounde aboute the face of the ſame.* *What the winde is.*

This bothe Homer, and th'olde Græcians, deuided only into. iiij. Eaſt, Weaſt, North & South. But thoſe that folowed them next, after à more exquiſite ſort, deuided the Horizont into. viij. equall portions. *Foure Principall windes.*

Spoud. *And what names did they deuiſe for them?*

Philon. *I will ſhewe you, they called th'Eaſt: Subſolanus, for that the ſunne riſeth there being in th'equinoctiall poyntes. The Weaſt wind alſo they called Fauonius, of noriſhinge: the winde whiche commeth out of the North, Septentrio: the South winde Auſter. Then the winde*

wind that bloweth betwixt th'eaſt,& the South,named South Eaſt. Alſo that which cõmeth out of that place betwixt th'eaſt & the north,they called it northeaſt. The ſpace directly betwixt the north,& the weſt,they named northweſt:as betwixt the ſouth,& the weſt ſouthweſt,as



in this ,figure A. B. C. D. repreſent the Horizõt,A. th'eaſt,B. the north:C. the weaſt,D. the ſouth:E. the northeaſt:F. the nortweſt: G. the ſoutheaſt:& H. the Southeaſt. Spo. Yet ther is another kind of partinge the Horizõt, thẽ you haue declared: for I remember that I red in Marcus Manilius, how the Horizõt was parted in 12. partes:but the reaſon of it I could neuer vnderſtande. His verſis as I remember,are theſe.

Marcus Manilius.

Aſper ab axe ruit Boreas: furit Eurus ab Ortu:
Auſter amat medium Solem:Zephyruſq: profundum.
Hos inter binæ mediis è partibus auræ.
Expirant ſimiles,mutato nomine,flatus.

From the North,rough Boreas come:& Eurus,from th'Eaſt:
Auſter,from the South bloweth: & Zephyrus,from the VVeſt.
Betwixt either of theſe quartes,two other windes broſt out:
In nature like:their names changed, whiſtling all th'earth about.

Phi. *Manilius doeth very aptly ſhew th'order of parting the Horizõt in to 12. partes. For (ſaith he) ther commeth two windes frõ thoſe partes of the Horizont,where th'equinoctial croſſeth it equally,of which,th'Eaſt he calleth Eurus: And the Weaſt Zephyrus, or Fauonius. Thẽ the meridiã circle croſſeth alſo the Horizõt equally*

in the middes. And ſo by theſe interſectiõs ther are two other windes deſcribed: the North, he calleth Boreas, The Southe Auſter.

Spoud.. *Theſe. iiij. are the Principall windes, & agreeth with Homer & th'olde Gretians.*

Philo. *Yea, but in the reſt it differeth bothe from thẽ. & alſo the ſeconde ſort. For theſe parted the Horizont in. 8. equall portiõs: but Manilius into. 12. inequal parts for he deſcribed. iiij. collaterall windes by the. ij. Tropick Circles, which are the places where the Sonne riſeth & goeth downe in the middes of Somer, and Winter. And*

also other 4. winds at the Circles Arctick & Antarctick.

Spou. I remẽber that in our first daies talk, you shewed me what th'equinoctiall, the Tropickes, & the circles Arctik & Antarticke were: notwithstanding I shall the more spedely conceiue your meaning, if you vouchsafe (as hetherto you haue vsed to geue me some example & picture hereof.

Phil. That I will not refuse to do, or any other thinge, so that the more vtiliti hereof may vnto you insue. Wherfore behold the tipe before placed in which. A.B.C.D. E.F.G.H. Is the place of the Horizont. H. the Northe. A. th' East: L. the Southe: & .B. the Weast. From which the Principall windes doth blowe. C. is the place wher the Sonne riseth in the Sommer, & E. wher in the same time of the yeare he setteth: Also. D. do represent the place, where as the sonne riseth in the winter poynte, and F. the coaste where he goeth downe. Also that part of the Arctick circles, which is most easterly marked with G, & th'other part furdest Weast, noted wyth F. also the part of the Circle Antartike furdest East, is marked with M. And th'other portion furdest west with K. But nowe in oure time, the learned Hydrographers, & Trauelours on the Seas, haue yet gone beyonde them all, partyng the Horizont in 32. equall portions, as sufficiẽtly answering vnto euery viage throughe the hole Earth, & they haue geuen them very apte names, as in this Instrument folowyng more largely appeareth.

The Horizont parted into 32 partes.

Spou. Thus I see, that by diligence, & laboure, small thinges haue great roote, & increasing. For firste

there

there were founde out but iiij. Cardinall, & cheif windes: after they wer made viij. in numbre, then xii. And now in our dayes 32. so that I beleue we be at the furdest, and that those whiche folow vs, shall not be able to adde any thing to this pertition of windes. Phi. You are much deceiued, if that you so do think, for the nũber of windes be infinite, & breke out of euery part of the horizõt. But like as 12. in nũber semed not sufficẽt: so 32. ar thought to answer in all parts, that is in Nauigatiõ required, & the deuisinge of å greater number, shall rather cause confusion of memorie: then helpe in this behalfe. Also by this Compasse (the Sonne shynynge) you shall perfitly

The number of windes infinite.

know the houre of the day by the coaſt he is in. As when he is right Eaſte, & Weſt, it is alwaye ſixe of the cloke: alſo, à Southe Sonne maketh xij. of the clocke. So in like maner, à ſoutheaſt ſonne, maketh ix. of the cloke, & à ſouth weaſt ſonne, iij. of the cloke after noone. Th'other houres are manifeſt by the compaſſe.

Spou. This is very neceſſary alſo in trauilinge. And nowe retourne to that, from whence we did digreſſe. Ther are certein qualities applied to the windes, wherof doth that ſpringe?

North windes colde.

Phi. There are ſo, & that cometh of the tẽperature of th'Earth, ſo that the North windes be called coulde, becauſe they procede frõ the froſen Zone, & theſe ſouth windes hote, becauſe that they come frõ the burnt zone.

South windes hote.

But this belõgeth more to Phyſick, thẽ Nauigatiõ. For we ſeke herin, to learne th'apt winde which ſhall cary vs, vnto the deſired Porte, & not health, which is the Phyſitions chiefe care.

Spou. I cõfeſſe no leſſe, but yet ſence we haue entred in to this matter, I wyll be ſo bold, as to trouble you herein

An obiection

further. And where as you ſay, the qualities of the windes ſpring of the tẽperature of th'earth, do you meane the zones, & Climates?

Phil. I do no leſſe: Spou. Thẽ ſeyng the North winde is called cold, becauſe it cometh frõ the north froſen zone, why by the like reaſon ſhall not the South windes be of like qualitie, cõming frõ the ſouth froſen zone?

Th'Anſwere.

Philoni. I wyll aunſwer you in few wordes. The North winde commeth from the North froſen zone,

and

and is felt in our Climate, becauſe we are ſituated, nerer that, then the South froſen Zone: whiche beinge vnder our fete (as you haue heard before declared) is kepte frō vs, & the couldnes of the winde, not only mitigated, but alſo greatlye altered, throughe the heate of the burninge Zone. And therfore the South windes are called hotte.

Spou. *This doth very well agre both to reaſon, & experience. So that in th' Equinoctial, wher both the north, and South windes meete, there the windes are called tē-perate, becauſe the couldnes of them is taken away by the heat of the burninge Zone. And by this alſo I gather, that ſuche as dwell in the temperate Southe Zone, (Κυτεύχατος Proclus call it) beyond th' Equinoctiall, they call the South wind cold, and the North wind hot.*

Windes temperate vnder th' equinoctiall

Phi. *It muſt neades ſo be, for that the burninge Zone qualifieth the coldnes of the Northe windes, throughe his heat, as to vs, he doth the South.*

Spou. *There is now an other dout entred into my hed, of which to be deliuered I muſt (or we furder proced) require your ientill aid. And that is, whether in deſcribing the .iiij. Cardinall windes, you call the North Pole, the furdeſt North poynt or not: and th' Antarctick Pole the South poynte.*

A queſtion.

Philon. *No verely, reſpecting our climate, but I call North, & South, the place of the Horizōt, which the meridiā circle rightly doth croſſe, as alſo th' eaſt, & weſt, wher th' Equinoct. croſſeth the horizōt.* Spo. *Thē vnder th' equinoctial, where the Poles are equall with th' earth*

Th' Anſwere.

the Poles them ſelues are the north & South poyntes.
Phil. *Jt muſte of force ſo be. But now ſeinge theis inſtructions ſeme ſufficient vnto you, touchinge the order, number, diuiſion, and names of the windes: J will paſſe from that, and conuerte my talke, vnto the deſired ſcope, (that is) howe to directe anye ſhippe, from place to place, from Port to Port, exactly by Art:*
Spou. *And that is a thinge, whiche ſemeth merueilous. For it is thought praiſe worthye to go by lande, directlye without errour, from one place to an other, farre diſtant a ſonder, hauing no path, or waye whereby to be guided. But in the wide Ocean, to finde à direct way, & to conducte his veſſell vnto the port deſired, is much more commendable. If Vliſſes had knowne this Art, he ſhoulde not haue bene ſo long toſſed on the troublous ſeas. If Diomedes, or Æneas, had bene herein learned, they had not ſo manye yeares bene driuen from place to place: knowinge not by what meanes, to attaine to their ſo longe deſired Region. What thing more commodious for Princes, was there euer inuented: more profitable for à comon weale: and more neceſſary for al men? And that conſidering the worthye Princes in time paſte, called Neptunus th'inuentor hereof, à God: as alſo Æolus, which found out the vſe of windes: For it is truely ſaid, honor noriſheth artes.*
Vliſſes.
Diomedes.
Aneas.
Neptunus.
Æolus.
Philon. *I wold in theſe daies, they woulde reward the learned, & painful (which ether inuent, or adde to that which is inuented) with à neceſſary liuing, & as for calling thẽ gods, let that paſſe, it is to great a title for mortall men. But omit we theſe thinges, as touchinge the direc-*

directing of anye ſhippe, you maye do it two waies: th'one by the compaſſe onely, whiche was to th'olde Hydrographers, vnknowne: th'other by longitudes, Latitudes, and the compaſſe, of which herafter we will ſhew the maner. *The compaſſe vnknowen to th'olde Hydrographers.*

As touchinge the firſte waye, I will not laboure to write much of, becauſe it is knowne well nie to euery Mariner. But yet I will ſhewe them certain obſeruations, by whiche there is found manye errors in the nedle: that done I will alſo declare, how they ſhall correct the ſame, and ſail more exactly then the moſt part are able?

Spou. Thys is à merueilous nedle, whiche beinge touched, (as I heare onlye with the Magnes) ſhoulde knowe to turne alwaye to the North pole, and that only by the ſame, the .iiij. Plages, and quarters of th'Earthe, are preſentlye founde oute. But what be th'obſeruations of this neadle, by whiche you affirme that it doth not exactlye poynte Northe, and Southe. *The praiſe of the neadle.*

Phi. They are of Iofrancus ſette forthe, in thys wiſe. In the Flande called Inſula Corui, it declined Eaſterlye .xv. degrees. Alſo in the place which ſhipmen call (Le Cap d'eſpoir en terre neuue) it declineth towarde the Weaſte .33. degrees, and .45. minutes. Againe at Deppe, (ſaithe he) it poynteth Eaſterlye to much, by .11. degrees well nie. *Obſeruations of the nedle where it hath erred.*

Spo. If this be certain, then in dede th'error is not tollerable, but admit it be not ſo much, yet error in all thinges (as much as is poſsible) is to be eſchewed, & veritie to be folowed. Wherfore I pray you, ſhew me how to find out à perfait nedle, & to correct it, if it be not perfect.

Phi. *Both the chosing of à nedle that is perfit, & also to correct the false, consisteth all in one precept. For if I can correct à false nedle, I can also chuse à true, & perfit: the way how you shall do that, is on this wise. whē you will verifie your nedle (if it be in the daye) you shall vse the healpe of the Sunne (and on the night) of some fixed sterre, marking diligently whā they are in the noneste ad line: & then direct your nedle vnto the Sonne, or sterre, & if the flower of the nedle be righte Northe from it, your neadle is perfit: or if the flower be toward the sonne, & th'other part of it North, it is also true, & this your nedle corrected, you shall perfitly directe your ship, without errour.*

How to correcte the nedle

Spou. *I can with my Astrolabe, or Quadrāt, obserue the height of the sōne, & sterre, vntill that he come to the meridiā, or noneste ad line (as you taught me in the secōd dais talk) & at that instāt, place my nedle right towards him.*

Fol.91.92.93.94.

Phi. *And this wil serue as wel on the seas, as on the lād. But on the lād you may draw à meridiane line, as I taught you, & set your cōpasse on the meridian Line, which you haue drawen, in suche maner, as the line North & South in the compasse, stand right in the same, & it is of all other th'exacte waye: & this hauinge youre line made, you maye at all times, verify any nedle, not tarying for the sonnes comming to the Meridian Circle.*

Spou. *But then my Meridian line whiche I haue drawē, must euer be fixed in some place without remouīg*

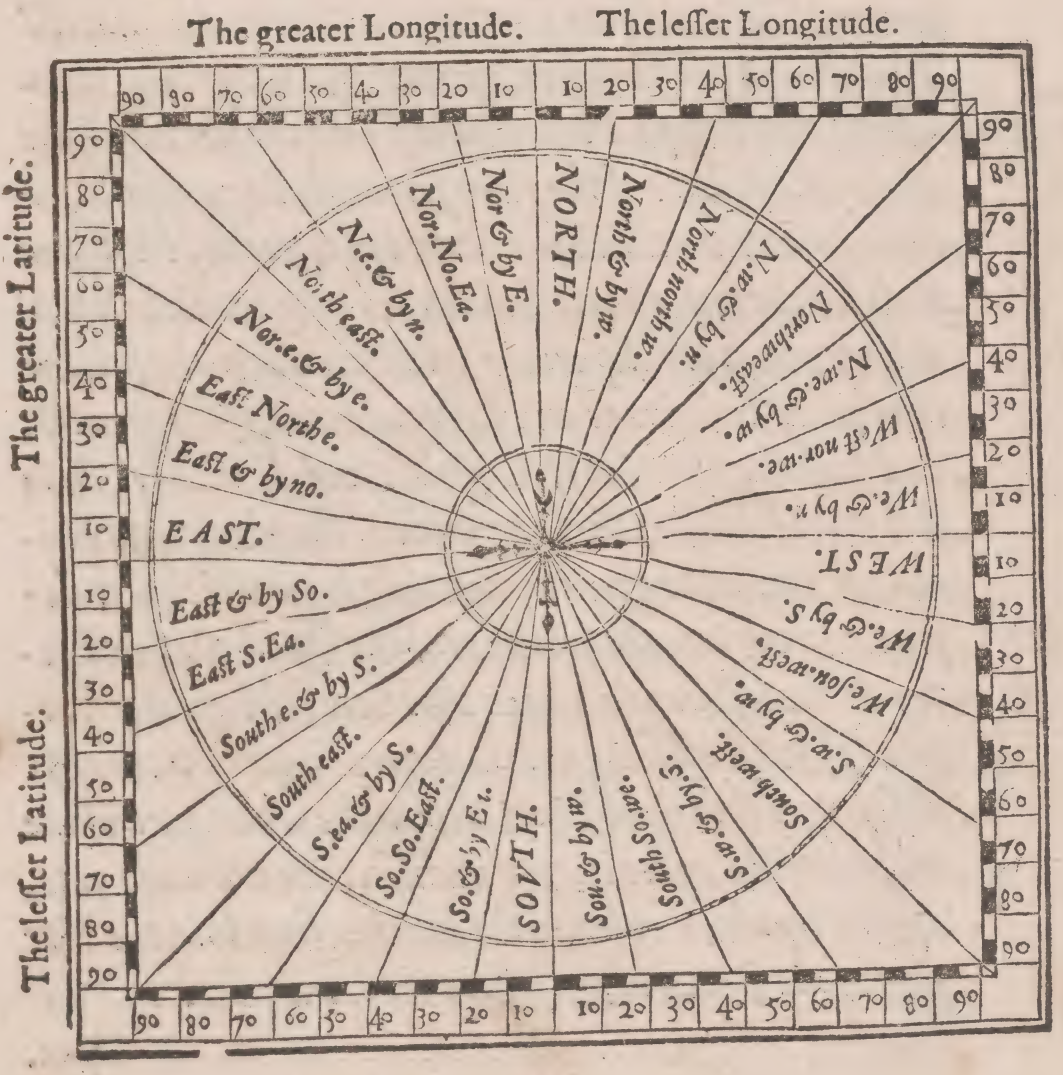
Philo. *It must neades folow. Ther is also great error committed in describing the shipmans Cart, because thei*

vse

vse right lines in the place of Parallele circles, of which at this time I will no further intreate.

Spoud. *Then I praye you begin the waye how to saile by Longitudes, and Latitudes.*

Philon. *Vnto this way are required the circles of the Spheare, the meridian altitude of the sonne by daye, and sterre by nighte, the heighte of the Pole, the longitude of Regions and Portes, and the vse of the shipmans quadrat, whose inuentor was worthy D. Gemma.*



Spou. *As touching the Circles of the ſpheare, you gaue me inſtructiõs in our firſt daies talke: alſo to find th'altitude of the Pole, ſonne, & ſterre in the ſecond daies meting: the longitude of places you promiſed to ſet forth by them ſelues & geue me at my departure: therfore ther, only remain, to ſhew me th'uſe of the quadrat, in this art.*

Phi. *Thẽ I will herin ſatisfie your expectatiõ & finiſh our talke for this preſent. This Quadrat as you ſe conteineth. 32. poyntes, with their names in them written.*

Spoud. *I perceiue it wel, but what is ment by thoſe degrees of Lõgitude, & Latitude, in that order placed?*

Howe to direct a ſhippe to any Porte.

Philon. *I will ſhew you, opening the whole Art of directing your ſhippe. Firſt you muſt ſeke out the longitude & Latitude both of the place from whence you ſaile, & alſo of that vnto which you intend to trauaile. Thoſe you ſhall for the moſte parte finde in my boke (whiche I will deliuer you at our departing) then ſubtracte the ſmaller number of Longitude and Latitude oute of the greater, and with the differẽce of Lõgitude and Latitude, do in this maner. Firſt if the Longitude of the place vnto whiche you trauell be greater then that from which you depart, entring into the hier part of the Quadrate (and towarde the left hande vnder thys title, the greater longitude) you ſhall ſeeke oute in degrees and minutes, thys difference. And do in like maner in the lower part of the table directly vnder it, & this difference ſo founde oute, apply à thride, or ruler, to the number founde in the hier part of the Quadrat, & alſo in the lower part.*

Spou.

Spou. *But & if the Longitude of the place vnto whiche I trauell, be lesse, thē that from whiche I departe shall I not then accompt the difference of Lōgitude from the middle Line, toward the right hand?*

Ph. *You must so do, but now as touching the difference in Latitude of the two places, if the pole of the place (vnto which you direct your shippe) be greater, then the Pole of the place, from which you losen then accomptinge frō the midde line vpward, vnder this title, the greater Latitude, & in like case toward the right hād, then draw and extend a thrid, or apply à rulers, vnto this nūber of latitud, & wher the .ij. thrides or rulers crosse one an other, ther make à marke for it is the place which you desire.* Spou. *But where shall be placed the port from which I must depart?*

Phil. *In the Center, or mids of the Quadrat. So that if you applie à ruler frō the Center of the Quadrate, vnto th'intersectiō of the two thrides or rulers, it shalbe manifest what point or winde, you must vse, vntill you haue finished your course.*

Spoud. *But admit the lōgitudes be not trewly obserued, & so I shalbe deceiued, how shall I know when we haue sailed the differēces in lōgitude of theis ij. places?*

Phil. *That you may at all times without difficultie bring to passe, by finding out the height of the pole: which you may do in the day, by the height of the sonne, at midday; or on the nyght, by some fixid Sterre: or (that Sterre which Shipmen call) the Lode Sterre.*

Spoud.

Spou. *How may I knowe the forme of this lode ſtarre?*

Phil. *Becauſe the forme of it ſhall much better make you know it, then th'vſe of many wordes, behold here the Figure folowing, in which you ſhall ſee the configuration both of the Pole Arctick, and alſo Antarctick. And now againe to oure former talke: hauing the height of the Pole found oute by inſtrumẽt, you ſhall enter into the Quadrat with thys number, findinge oute the Latitude, frõ the midline, vpward or downward, as before it was declared: & apply à ruler vnto the ſame place, noting diligentlye where this ruler, toucheth the line whiche was drawne frõ the center, vnto the interſectiõ of the difference of Lõgitude and Latitude firſt taken. Thẽ accõpt the like number in the differẽce of Lõgitude, that you did of Latitude, and applying the ruler ther vnto, it ſhall ſhew plainly the lõgitude of that preſẽt place, like as the line from the center, do certainly declare the coſte of the worlde.*

A. Is the Soũthe Pole,
D.C. th' Equinoctiall.
B. the Northe.

Spou. *This ſemeth to haue à ſinguler vſe in rectifying the longitudes of places. Nowe that, whiche here is ſpoken, toucheth onlye th'exacte courſe (and as it were) the pathe, in which we muſte ſaile. But if greate windes, tempeſtes, and ſtormes ariſe, ſo that we are vtterly driuẽ from oure courſe, toſſinge vp and downe, the Seas, howe maye I knowe, in what Parallele, and Climate, we are, that*

How to know in what place they are, beyng driuen from theyr courſe.

that therby we may come againe to our right course.

Phil. *That shall you do by the helpe of the Table of Clymates, & Paralleles, in the seconde boke, & by the Eleuatiõ of the Pole, the findyng of whiche I haue so oftẽ set forth, that I am ashamed to make therof any more mention.* Fol.77.78.

Spou. *Then you will that hauinge the height thereof, I shall enter into that table of Climates, & seke ther the eleuatiõ, & directly against it, I shall finde the name of the Paralleles, & Clymates.*

Phil. *You do rightly vnderstande my meanyng. And these thinges parfaitly kept in memorie, & put in practise, when as occation shall be ministred: ther ar not many other thiges in this busines requisite. Wherfore, seyng that I haue satisfied your requeste, in all such thinges as you at our first daies meting desired, I thinke it à conuenient place, at this time to make an ende touchinge this Argument of Cosmographie, Geographie, & Nauigation. And therfore depart with me, & you shall receiue the Boke, which I promised, conteinynge in it the Longitudes, & Latitudes of the famous Regiõs, Countreis, Cities, Townes, Villagies, & suche like, as ar placed on the face of th' Earth. And when you find any other doubtes, either in this Arte, or any other belonging to my professiõn, if you do to me resort, I will therin willingly helpe you to my power.*

Spoud. *I thanke you most hartely, & thus haue I kept you (for my vtilities sake) from your vrgent, and ne-*

neceſſary buſines, this long ſeaſon, & that without receiuing at my hand againe any recompẽce. But ſence I can not do herein what my good will is, I ſhall referre the whole vnto God, who plẽtiouſly rewardeth the good trauelles of euery man.

OF IRLANDE.

IRland is an flād very fertile, subiect to the Crowne of Englād: In it ther ar great plētie of wolues, red Alume, sea Cole, also mines of gold, & siluer, & in sūdry places Pearles are foūd. It bringeth forth very many herbes necessarye for the healthe of man. It is free from Venomous beastes, & Wormes, as Ranny, Tode, Edder, Snack, swift, or such like. The people are sauage, wilde, & beastly, they are giuen to sorcerie, superstitiō, & witchcraft: their shirtes, & smokes are saffroned, they go with long Mantils, Their weapons in battel are Darts, & swords, which neē brodest at the point: theyr so thē all Instrumētes in batginning Bagpipes. They denot expres any coloured fringtion of places eat drinkers ofether to trauell ich is ther onons of the moost lealiue vnto for whiche he will wrigd. vnto 90. yeares. The longitude of it, is supposed to be 280. Englishe miles, & the breadth, 92. miles. The middes of this Flande hath in longitude, & latitude. 7.0.57.0. The chiefe places are

*The north pmontorie.	13.0.61.0
*Venicnium promontorie.	12.50. 61.20.
Reba.	6.40.57.20.
Lamon.	7.5.56.30
S. Patrickes Purgatory	6.42.58.50
*Diuiline. Eblana.	14.0.59.0

☞ There are ioyninge vnto Irlande, fiue Flandes called Ebudæ, but of Plinie, Hæbudes. Of which that whiche is moost west, is called properlye

*Ebuda.	15.10.62.0

That which is moste East.

*Ebuda.	15.20.62.0
Ricnea.	17.0.62.0
Maleos.	17.30.65.10
Epidium	18.30.62.0

☞ Also on th'east part of Irlande, are these Flandes.

*Monarina	17.40.61.30
*Th'Ile of Man	15.0.57.20
*Adros, a desert.	15.0.59.20
Limnus, a desert.	15.0.59.0

OF ENGLANDE.

ENglande the most famous and plentifull Iland in all the

neceſſary buſines, this long ſeaſon, & that without receiuing at my hand againe any recompẽce. But ſence I can not do herein what my good will is, I ſhall referre the whole vnto God, who plẽtiouſly rewardeth the good trauelles of euery man.

Lõ-
don me
alſo take
as excepte)
e, & ample a
ueſcretion & iud-

A per-

OF IRLANDE.

IRland is an flād very fertile, subiect to the Crowne of Englād: In it ther ar great plētie of wolues, red Alume, sea Cole, also mines of gold, & siluer, & in sūdry places Pearles are foūd. It bringeth forth very many herbes necessarye for the healthe of man. It is free from Venomous beastes, & Wormes, as Ranny, Tode, Edder, Snack, swift, or such like. The people are sauage, wilde, & beastly, they are giuen to sorcerie, superstitiō, & witchcraft: their shirtes, & smokes are saffroned, they go with long Mantils, Their weapons in battel are Darts, & swords, which are brodest at the point: theyr musicall Instrumētes in battell, are Bagpipes. They delight in many coloured fring. They are great drinkers of Aqua vitæ (which is ther only medicine.) They liue vnto 60. 70. And (as I here) vnto 90. yeares. The longitude of it, is supposed to be 280. Englishe miles, & the breadth, 92. miles. The middes of this Flande hath in longitude, & latitude. 7.0.57.0. The chiefe places are

*The north promontorie.	13.0.61.0
*Venicnium promontorie.	12.50. 61.20.
Reba.	6.40.57.20.
Lamon.	7.5.56.30
S. Patrickes Purgatory	6.42.58.50
*Diuiline. Eblana.	14.0.59.0

☞ There are ioyninge vnto Irlande, fiue Flandes called Ebudæ, but of Plinie, Hæbudes. Of which that whiche is most west, is called properlye

*Ebuda.	15.10.62.0

That which is moste East.

*Ebuda	15.20.62.0
Ricnea.	17.0.62.0
Maleos.	17.30.65.10
Epidium	18.30.62.0

☞ Also on th'east part of Irlande, are these Flandes.

*Monarina	17.40.61.30
*Th'Ile of Man	15.0.57.20
*Adros, a desert.	15.0.59.20
Limnus, a desert.	15.0.59.0

OF ENGLANDE.

ENglande the most famous and plentifull Iland in all the

Earth of Ptolomæus called Albion, afterward Britãnia ſecunda: Bicauſe that in the daies of Ptolomæus, Scotlãd & it were accompted for one Flande, It is inuironed about with th'Oceã Seas, not much vnlike to à Triãgle in ſhape: it hath on th'Eaſt parte of it, Germany, on the South Eaſt, Fraunce, on the Weaſt, Frelande, & on the North, the 30. Flandes, called Orchney. Of Englande, both of the finding of it firſte, & alſo of the perticuler deſcription, hereafter, I ſhall more largly ſpeak (if God graunt life.) At this time, I intend but onely to ſet out the Longitude, & Latitude of the chiefe Cities, & Townes, as here foloweth.

*Bathe, Aquæ calidæ. 17.30.53.40
*Banger, Ganganotum. 15.30.57.30.
Berwicke. Tueſis. 17.0.56.50
*Bodnam. Voliba. 14.50.52.20
Bedforde. 21.0.52.0.
Bukhingham. 21.0.52.50
Bury. 22.20.52.0
Callis. Caletum. 25.10.51.40.
Caërleil. Caturactonium 19.30.58.0
Caëmarden. Maridunum 15.30.54.40

*Cambridge, à Vniuerſitie floriſhing with al kind of good letters. 21.30.52.0
Canterbury. 22.10.51.10
Cheſter. Vſellum. 18.30.52.10
*Chicheſtre. Næomagus. 19.43.53.35.
Colcheſtre. Camulodanum. 21.0.51.40
Couentrie. 20.0.52.0
Darbie. 20.0.54.10
*Dee. Deua, a riuer. 17.0.60.0
Doncaſter. Deuana. 18.30.55.0
*Doram. Dunum Sinus. 20.45.57.30.
Elye, an Ile. 21.36.52.16
Exceſtre. Iſca. 17.30.52.15
Glouceſtre. 18.0.54.30
Harforde 20.0.52.50
Humber. Abus, a riuer. 21.0.56.30.
Huntington. 21.0.53.20
Hulle. 21.10.54.34
Kirkby. Olicana. 19.0.57.30
Lancaſtre 19.0.55.0
Leiceſtre. 19.40.52.50
Lincolne. Lindum. 18.20.55.10.

London of Ptolomæus called Lõdinium, is the chief & principall citie of all th'Iland, it is exceding populous, it is inhabited with men of euerye facultie, it was builded before Rome. 420. yeare, before

fore the reign of Alexander the great. 811. yeres, & befor Christ our sauiors incarnatiõ 1136. so that from the firste buildinge of it, the yeares are 2735. And whereas Cities throughe processe of time do come to ruin & decay: this Citye contrariwise do more and more beautifye and increase. the Longitude & Latitude.

19.52.51.30.

Mancheſter. Mediolanium. 16.45 56.40.
S. Michaels mount. 12.0.51.30
New Caſtell. Orrea. 19.20 58.55
North Hampton. 21.0.52 15

Norwiche an healthfull & pleasant Citye, hauinge à faire Riuer called Yerus, ronning thorow it, which cometh out of the seas, frõ Yermouthe coste. It is much subiect to fiers, which haue not à little hindred the beuty therof. The picture of it you shall find liuely set out in the firste boke: the longitude & Latitude. 22.30.52.10..

Notyngham. Hrate. 18.0. 55.30.

Oxenford called (of Ptolomæus) Caleua à norishe of learning, and à famous vniuersitie it is in Longitude & Latitude. 19.0.51.50.

Penbrouch. 16.0.53.40
Peterborough. 21.0.53.20
Portsmouth, 19.0.51.20
Richmunde 19.0.55.20
Sandwich. 21.45.54.0
Salisbury. 19.0.51.50
Seuerne, a riuer. 17.20.54.30
Sudburie. 21.20.51.55
VVincheſter. 21.30.50.15
VVight, an Ilande. 19.20 52.20
Yermouth. 22.20.52.20.
Yorke. 19.0.54.20
Ypswich. 22.0.52.40
Tynemouth. 24.0.58.30
Tenet, an Iland. 23.0.54 20.

OF SCOTLANDE.

Scotland being reconed of Ptolomæus, but for part of Albion is parted by two armes of the seas, which mete not from England. Th'east arme begin about. ij. miles from the minster of Eburcuring: the weast arme on the right side, à strõg Citie Aclynd (whiche in the Britishe tongue, was called the Riuer Clynt.

The chiefe cities, & townes, are these folowyng.

S. Andrewes.	16.40.57 55.
Dunber. Varer	17.0.59.30.
Dundie.	19.20.59.30
Dunkel.	19.20.58.0

Edenbrugh called Alata castra is the chief Citie in all Scotlande. 17.15.59.20

Saint Iohns	15.40.59.15

Also the middes of the 30. Flandes adiacent to Scotlād, called Orchney. 30.0.61.40

OF ISLANDE.

ISland called of Ptolo. Thyle, is an Flāde subiecte to the king of Denmarke: it is full of marualous thinges to beholde. Amonge whiche ther are iij. mountaines of an incredible height: the toppes of which ar cōtinually couered with snow. The first mountaine is called Helga: the seconde, the moūt of the Crosse: the thirde, Hecla, which cōtinually (like to the mountaine Ætna) doeth burne, castig with violēce (as it were out of à Gūne) greate stones frō it. And this fire cannot by water be quēched, & that which is to be wondred, although the fire be maruelylus great, & of force, by reason of the Sulphure, yet haye straw, or rede, is not of it cōsumed. Sulphure is there so plētifull that you may for the 4. part of à ducate, haue à thousande weight. There are also 4. Foūtaines of à diuerse nature, & qualitie. The first, if you cast in à sticke, mā, beast, or what soeuer it be, it torneth it presently into à stone, yet it reteineth the naturall forme still. The seconde is of an intollerable could. The third is much sweter then Hony, & most pleasātly aswageth drines. The fourth is Pestilent, Poisonable, & deadly. Whā as the Sonne is in the beginning of Cancer, it is continual day with them, & whan he is in Capricorne, also continuall night

night, & darknes. They are à simple people, & hould the the faith of Christ. Thei haue no king, but all obey the Bishoppe as theyr kinge. Their marchandise are Fishe, wadmoll, & sulphur. There are found Falcons, Sperhaulkes, Crowes, Beares, & Wolues, both white & blacke. Roũde about this Flãd, for the space of 6. or 7. mõthes, th' Ise swimmeth, makinge à miserable sound, & noise, so that th' inhabitauntes suppose that in the mount Hecla, & in this Ise, the soules of men & women, are tormented. The frosen, & congelid Seas beginne at this Iland. It is now much trauailed to of englisshmẽ, & Danes, & that in the Sõmer onely, because of the horrible colde, & aboundance of Ise. The middes of this Ilande

7.0.65.30.

Harsol, a Citie 7.40.60.42
Thirtes, a Citie. 5.50.64.44
Nadir, a Citie. 6.40.57.20

OF CORSICA.

CORsica, an Iland whose chiefe places are

Istria. 30.30.40.15
Mariana. 30.10.40.20
Nebia. 31.0 40.40
Aleria. 31.35.40.20

SICILIA.

SIcilia, an Flande.

Palerna. 35.30.36.10
Marsara. 35.20.35.30
Gergentum. 36.20.35.10
Terminæ. 35.55.36.5
Pula. 36.0.36.0
Siracusæ, 37.20.35.30
Cataua. 37.40.36.0
Messina. 38.0.36.40
Aetna, the burning hil. 37.10.35.20

OF THE CHIEF Cities, & townes, in th' Ilande of Sardinia.

SArdos. 30.20.38.58
Galea. 29.40.37.50
Argetara. 29.30.36 30
Arestana. 29 45.36.50
Aquilastrum. 31.20.37.30
Cambonara. 31.30 36.30
Stira. 30.30.36.40

OF TH'ILANDES called Maiorica, & Minoria.

MAiorica, & Minorica, be Ilãdes adiacent to Spaine, & Maiorica conteineth in Lõgitude, & Lat. 17.40.38.30

Minorica. 20.0.39.0

GADRIA

GADIRA AN
Ilande.

Gadira, whiche is also called the Gades, in the west Oceã vnder 5.digr.30.34.0.

EVBOEA, AN
Ilande.

EVbœa, nowe called Negropont: Is an Ilande to Achaia ioyning. 54.0.38.0.

CRETA, AN
Ilande.

CReta, nowe called Candie, an Ilande famous. 55.0.35.20.

CYCLADES.

CYclades, are Ilandes about Delus. 56.10.37.20

SPORADES
Ilandes.

THese Ilandes are also ioynynge to Delus, they ly scatered about in the seas, of thẽ read Plinius lib.4.capite.xij.theyr Longitude, & Latitude.56.10.37.20

Thus endeth the perticuler description of the chief Ilands in Europe.

OF SPAINE.

SPain as it appereth in the Table thereof in Ptolomæus Geographie, it compassed aboute with the seas, excepte it be in that parte whyche toucheth Fraunce, and is parted from Fraunce by the Pyrenean mountains. And it is the first Region, Weast betwixte Africke & Fraunce. It bringeth fourth such aboundance of pleasaunte fruictes, that it serueth not onlye the necessitye of it selfe, but also of Italie and diuers other partes. They do not boyle their salt, as they do in Selande, but dig it oute of th' Earth. The men go all for the moste parte in shorte clokes, and commenlye blacke. This Region in tyme paste, was deuided into fiue Kingdomes, that is to saye, Gallicia, Nauarra, Castille, Catalonia, vnto which is ioyned Aragonie, Portugale & Granate. Of whiche we will

will perticulerlye touche the chiefe Cities, & townes, beginning with Castilla, whose principall Cities, & Townes are.

Tolet, where the famous king Alfonsus made his astronomicall Tables, conteining the mouinge of the heauenly Bodies. 10.49.37.0

Salamanca 7.20.38.20

Valeria now called Concha. 11.34 43.5.

Alcala de Enares. 10.20.41.40

Logronyo. 12.10.44.0

Valladolit. 10.10.42.0

GALLITIA.

Compostella, wher S. Iames is 7.0.42.15.

Landes end. 4.23.44.2

Almoisa. 4.40.44.45

Bilbao 11.45.45.25

Fontarrabie 13.13.44.15

S. Sebastianus 15.30.45.5

NAVARRE.

Pompelon 13.15.42.0

Vaganna 12.15.43.0

CATHALONIA.

New Carthage 15.57.38.0

Tarragone 16.12.41.0

Gerona 17.42.42.12

Barsalona 17.0.41.35

Valentia 14.38.36.10

ARRAGONIE.

Sarragossa 13.45.41.45

Burges. 10.33.42 48

PORTVGALE.

Lysbona 5.0.36.40

Portugallo 4 56.41.35

Arcobriga 5.40.36.35

Badaioz 5.20.39.0

Cabo de. S. Vincentio. 2.32.38.15

Braga 6.0.43.40

S. Maria de Guadalupe. 8 30.39.30

GRANATE.

Granate 8.34.34.20

Hispalis. 5.42.37.0.

Corduba 7.4.37.50

Calpe, both one of the Pillors of Hercules, & also à moũtaine called at this daye Gilbalter where the streit is named Zibalter. 7.30.36.15

Vama 6.15.38.25

Malaga 8.50.37.30

OF FRAVNCE.

FRaunce beyng seperated from Spaine, by the Pyrenean Mountaines foloweth nexte. It is parted from England, by the Englishe Seas. It conteineth many dukedomes. It is garnished with pleasant Cities, & townes, of which I wil set out the principall: begining with the weast part first.

NARBONA HATH

Vienna. 26.0.45.0

Ebredunum. 28.8.43.30

Brianconum. 28.30.45.0

Gratianopolis. Granoble. 27.0.45 30.

Tarantasia. 29.0.45.0

Gebenæ. 28.0.45.45

Mauriana. 28.30.44.30

Vapincum. 27.15.43.30
Dinia. 27.35.43.5.
Valentia. 26.0.44.10
Romonum. 26.0.44.30
Siſtarica. 26.45.43.20
Viuarium 25.45.43.45.
Auraſicum 26.30.43.30
Auinio. 25.45.43.15
Carpentorate 26.5.43.15
Tritaſtra 25.45.43.0
Arelatum. Arles. 25.50.42.45
Maſsillia. 26.30.42.5
Tollona. 27.30.42.0
Barcellonna. 28.30.43.15

AQVITANIA.

Burdigala. 18.0.44.30
Baiona. 17.30.44.30
Vaſaticum. 18.15.44.0
Tarba. 19.15.42.15
Lorona. 18.10.42.0
Lebretum. 18.30.43.10
Auſcus. 20.15.43.0
Lombarium 21.20.42.40
Tholoſſa. 22.10.42.50
Rinum. 21.45.42.15
Conſerana. 22.15.41.50
S. Pontius. 23.0.42.15
Narbona. 23.30.42.0
Agata. 24.0.42.10
Mirapiſcæ 22.45.42.15
Lodeua. 23.45.42.50
Beſerium. 23.30.42.20
Mons peſsulanus, Monpeleier. 24 30.42.50.
Aſtrericum. 23.0.43.0
Vabra. 23.15.42.45
Varinum. 22.15.43.15
Albia. 22.30.43.40
Montalbanum. 21.30.43.30
Cadurcum. 22.0.44.0
Rhodium. 23.15.43.30
S. Florus. 23.30.44.0
Anicium. Lepny. 24.30.44.15

CELTICA GALLIA.

Lugdunum, Lyons. 26.0.45.15
Niuernium. 24.0.46.40.
Lamouica. 21.30.45.45
Petragoricum 21.15.44.40
Engoliſma 20.30.44.50
Xantona 19.0.45.0
Luxiona 18.30.46.30
Nanetum 18.15.47.15
Rhedona 17.30.48.10
Turonia Tours. 20.15.47.30
Aurelia orleans 22.0.47.30
Conſtantiæ 18.40.49.35
Lutetia Pariſiorum. Paris the head Citie of all Fraunce in which is à floriſhinge vniuerſitie, the fame where of is ſpreade throughe all Europe. 23.30.48.40.
Seno. 24.0.47.45
Cathalanum 25.30.48.30
Lingo 26.30.47.30

GALLIA BELGICA.

Rothomagus, Roan. 21.30.49.30
Catalaunum, Chaalõ. 21.30.48.30
Rettena. Rethe. 22.26.49.0

GERMANYE.

GErmany, the moſt ample, & large Regiõ in in all Europe, ſomtime diuided frõ frauce, by the Rhine: from the Pannonians by the riuer Danubye, & from Sarmatia & Dẽmarke, by moũtaines, & Hilles, & in al other partes hauing th'Ocean Seas. But in our daies, it exten-

it ſelfe more largely. It maye compare at this tyme wyth Spaine, Fraunce, or Italy, in cõmodities to it beloging. For it is beautified with moſt pleaſaunt Cities, Townes, & Caſtels, it hath great woddes, aboundance of fruites, & hils repleniſhed with plẽtiful Vines. There are alſo theſe famous, & helthfull riuers, the Rhine, Danuby, Moganus, Albis, Neccarus, Sala, Odera, with diuers other. It is parted into the hier Germany & into the lower, of which we will firſt ſet out the princi pall cities and Townes.

Seelãde, an Ilãd the furdeſt cõfines of Germany the middes of it, in Longitud, & Latitude. 25.0.52.0.

Middlebourgh. 25.26.51.48

HOLLANDE.

Traiectum, Vtrick. 27.15.52.20.

BRABANT.

ANtuerpia, Antwerpen, the nobleſt Towne in all Europe. 26.36.51.28

Louaine, a vniuerſitie. 20.36 50.59.

Bruxella. Bruſſell 20.16.51.28
Mechlinia Machelen 20.20.51.15
Lira. Liere 20.24.51.21

FLAVNDERS.

Gandauum Ghent 2).30.51.15
Bruge brugge 24.30.51.20
Tornacum. Tornay 25.15.50.10

PICARDIE.

Ambianum Amiens 16.40.49.49
S. Iodocus 16.52.52.0
Samarobriga 22.20.52.10

LVCENBVRGE.

Lucenburgum 25.30.50.0
Creutznacum Creutz 24.34.50.2
Sarbruccũ. Sarbruck 23.47.49.16
Keyſerluterna 24.44.49.22

GVLICH.

Bonna bonne 23.23.50.47
Iuliacum Gulich 22.44.51.8
Leodium Ludich 21.48.50.51
Aquiſgranum Achen 28.45.50.55

GELDRIA.

Geldria Gheldere 23,48.51.42

CLEVIA.

Cleuis. Cleff. 22.6.52.0

HELVETIA.

s. Gallus 27.6.47.8.
Conſtantia 26.43.47.30
Tigurum Zurch 26.36.46.48
Badena Baden 25.16.48.44
Lucerna 26.0.46.34
Friburgum 37.30.51 50
Berna 24.18.46.25

ALSATIA.

Colmaria 24.3.48.12
ſeleſtadium ſchletſtad. 24.6. 48.22
Cæſarmontanum Keyſerſperg. 23 48.48.14
Hagenoia Hagenau 24.36.49.7

CITIES OF BASSE Germanye.

Colonia Agrip 29.45.51.0
Campena Kampen 28.30.52.50

Confluence, cõmonly called Coblentz, wher two faire riuers the Rhine, & Mosell mete. 30.15.50.20

Andernachum Andernacke. 30.0.50.25.

CITIES, AND TOVVNES of hie Germanie.

Maguntia, Mentz, the Bishoppes seat. At this Citie was th' Art of Printing first foũd (by Iohn Faustus) in the yere of Christ our sauiour. 1453. The Lon. & lati. 31.15.50.0

VVormatia, wormes. 31.30.49.40
Spira Spier 31.30.49.15

Argẽtina, Strausborough à notable citie, in which Iohn Sturmius, & D. Seuenus excellẽt Orators floriſhed 1559 30.15.48.45.

Basilia. Basile 29.45.47.45
Schathusa 28.0.47.28
Curia chur. 32.0.47.30
Vesalia 26.20.51.30
Francofordia 31.40.50.10
Curia 32 0.47.30.
Marburgum 32.10.51.0
Bremen 32.10.53.40

Heydelbergũ, called Heydelberge, is à floriſhing Vniuersitie, mainteined by the Palsgraue, by it ther rũneth the riuer Neccarus: ther floriſhed 1559 in Phiſicke, D. Iohn Langius, the Princes Phiſician, Iacob Curio, Thomas Erastus, Petrus Lotichius Secundus, all Doctors in Phiſick: And D. Balduinus the Reader of the Ciuill Lector, with diuers others, of whom I was very gentely interteined at the time of my Commensment. 32. 0.49.30.

Vlmes 33.0.48.30
Herbipolis wirtzpurgk 33.30.50.0
Amberga 34.0.47.15
Augusta 34.0.48.15
Brunsuiga 34.40.52.40
Ingolstadium 34.45.48.30
Hamburgum 34.0.54.30
Limeburgum 34.45.5.45
Ratisbona 35.40.49.0
Erdfordia 35.0.51.10
Lubecum 35.20.54.50
Liptzigum 36.30.51.30
Magdaburge 36.10.54.50
Salisburgum 36.30.47.30
Brandenburgum 37.20.52.40
Rostochium 37.10.54.36
Misna 37.20.51.50
Peurbachium 37.35.48.15
Berlinum 38.30.52.50
Praga 38.20.50.6
Gripsualdia. 38 55.54.20
Vratislauia 41.20.51.5
Gran 42 50.47.15
Posna 42.0.52.45
Buda 43.0.46.50
Lonreth 43.20.52.30

Thorn

1853
1453
400

Thorn	43.30.53.30
Cracouia	44.30.50.15
Mons Regius	49 0.45.0
Dantiscum	46.0.54.55
Caraloſtadium	33.25.50.0
Noribergum	34.40.49.30
Munſter	32.0.52.5
VVitenberga	32.10.53.40

MOSCOVIA.

MOscouia is à longe & ample Regiõ, the people miſerable, ſuſpicious, & craftie, the chief citie of ther Empirour is alſo called Moſkaua. 69.0.57.0. Thither ſailed out of England. 1553 Chancelour, & diuers other. The nature of th'inhabitantes, cõmodities of the coũtry, & à perfite deſcription of all the parts of the ſame you ſhal ſe at large ſet oute by Sigiſmunde Liber baron &c.

ILLIRIA, AND Dalmatia.

ILliria, which is called Lyburnia, hath on the North parts Pannonia, on the weſt Iſtria, on the South the Venice ſeas, & on th'Eaſt Dalmatia the chiefe Cities, & townes are

Sara	40.5.44.9
Stridona the countrye of Saynt Ierome	42.20.43.20
Flauona	37.0.44.45

DALMATIA.

Raguſia	45.0.42.20
sibinicum	43.0.43.20
scutara	45.30.41.30
saloniana	45.0.43.20
Durazo	45.55.40.55

ITALIE, AND LOMbardie.

Brunduſium	41.0.39.30
Tarentum	40.30.39.15
salernum	37.20.39.30
Naplis	38.50.39.55
Capua	36.40.40.5
Aquilea	36.40.41.10

Roma, à Citie famous through all th'Earth.

36.40.42.0

Sena	34.10.42.0
Florence	34.15 42.45
Viterbia	35.0.41.15
Piſa	33.0.42.15
Luca	33.30.42.45
Ancona	36.40.42.30
Bononia	33.30.43.40
Rhauennæ	35.0.43.15
Farraria	34.10.43.50
Parma	32.30.43.50
Verona	34.0.44.25
Venice	35.30.44.45
Padua	35.0.44.45
Mantua	33.10.44.10
Vincentia	34.39.44.20
Cremona	32.45.44.20
Placentia	32.30.44.20
Myllan	31.45.44.15
Tortona	31.30.44.0
Genua	31.30.43.15
Taurinum	30.40.43.45
Niſa	29.30.42.40

Secusia	29.45.44.0
Grassa	29.50.42.55
Albinga	30.40.42.55
Vercellæ	30.30.44.30
Nouaria	30.15.45.0

A PERTICVLER DESCRIPTION of Grece, and firste of Macedonia.

MACEDONIA.

MAcedonia hathe on the Northe parte Thrasia & the hier Misnia: on the West, the Venetian seas: on the south parts Epirus and Achaia: On the East the Seas called Egiũ Pelagus. The principall Cities, & townes of it are Thessalonica, now Salonica the seate of the chiefe Bishoppe of the Philippians, vnto whome S. Paule wrot two Epistles, the first from Athenis, the secõde from Laodicia the chiefe bishopriche of Phrygia, where alsõ S. Paule preached the Gospell. 49.50.41.0

Apollonia	45.6.40.10
Aulon	44.50.39.56
Bullis	45.0.39.45
Arethusa	50.10.41.0
Panormus	54.404.1.0
Hadrianopolis	50.55.40.55
Ampelus	51.15.40.30
Iõleos	51.30.39.15
Demetrias	50.30.38.56
Larissa	51.20.38.50
Thebæ Thebs	51.10.38.30
Arnissa	45.20.40.40
Elima	45.40.39.40
Amantia	46.0.39.40
Albenopolis	46.0.41.0
Europus	46.30.41.20
Apsalus	46.20.41.5
Parocopolis	48.40.41.40
Amphipolis	50.0.41.30

Philippis à Citye where the great Alexander was born, and from this Citie S. Paule sent his second Epistle to the Galatians. 50.45.41.45

Heraclia	47.40.41.30

EPIRVS VVHOSE cheife places are

Nicopolis	47.30.38.30
Cassiopa	47.0.38.45
Ambracia: Iarta.	48.8.38.20

ACHAIA, VVHOSE chiefe places are

Athenæ sometime the fountaine and wellspringe of all good letters, heare did Plato and Aristotle teach, it is now destroyed. 52.45.37.15

Megaris	52.15.37.30
Peloponesus, Morea.	51.10.37.30
Modonam.	48.30.26.0
Parnassus, a mount.	50.20.38.0

Helicon the holy Hill of the Musis, at the foote, wher-

of

innumerable multitude of venamous wormes, & wilde beastes, which are naturally ennemies vnto mankinde. As the Lion, the Olephant, the Tiger, & such like. Also, Dragons, Chrocodile, Cocatrice, & sundry other venomous Wormes, in suche sorte that th'inhabitauntes are compelled to put on botes, for better auoiding their sting, & poison. The part that is inhabited, is frutful enough. The people blacke, Sauage, Monstrous, & rude: yet in those countries, cities, & townes where the Spaniardes, Portugalles, Italians, & other do frequent, the people are sumwhat more ciuill, modest, & reasonable. Diuers also (yea right graue authors) make mẽtion of certaine deformed that dwell in Africk, as men with dogges heades, called Cynocephali, some with one eye & that in the forehead, named Monoculi, others without heades, & theyr face in the breast, with diuers such like which I suppose rather fables then any truth. If you desire à longer descoure Towching Africk, hir inhabitãtes, & cõmodities, read Strabo, in his 2. & 17. bokes. And also Plinius his 8. boke, with diuers other writers, which at large do herof intreate, & now I will (folowing my order begun) set out the notable regiõs (which Ptolomæus numbreth to be 12.) with theyr chiefe Cities, Townes, hilles, & riuers, with in Africke: & first we will begin with Mauritania, which is diuided into Mauritania Tingitana, & Mauritania Cæsariensi.

OF THE PRINCIPAL PLACES IN Tingitana or Barbarica Mauritania.

Feſſe	10.0.30.0
Tingis cæſaria called commenlye Tanger	6.30.35.30
Abilis one of Hercules Pillers, is a hill againſte Calpe an other Hill in Spaine	7.50.35.40
Baba	8.10.34.20
Banaſa	6.30.34.20
Septa	7.30.35.55
Sala	6.55.34.0
The Sonnes Mount	6.45.31 15
Benta	9.30.33.40
Dorath.	10.10.31.15
Tamuſida	7.15.34.15

MAVRITANIA CÆſarienſis.

Apollos promontorie	15.30.33.40
Iulia Cæſaria.	17.0.33.20
Tucca.	20.0.31.30
Hippa.	20.15.29.50
La Guardia.	12.0.34.20
Ciſſa. Cerlel.	18.45.32.10

IN AFRICK THE leſſe.

Colops the greater.	27.40.32.20
Colops the leſſer.	29.20.32.35
Hippon	30.30.32.15
Vtica, where Cato died, now called Benſert.	32.0.32.45.
Carthage.	34.40.31.50
Clupea.	35.0.33.20
Sabatra.	41.0.31.0
Vſanum.	33.15.32.20
Dabia	33.0.29.40

NVMIDIA.

Culuca.	28.30.31 0
Tucca	29.30.31.20
Bizancina	37.50.30.40
Capſa.	37.30.29.45
Calatha.	31.0.53.40
Sabrata	41.15.30.50
Ammon.	65.30.28.0
Oaſsis the great.	59.20.26.55

MARMARICA.

Alexandria.	60.30.31.0
Memphis	62.50.29.50
Cayrum	62.15.30.0
Syẽne.	62.15.23.50

LYBIA INTERIOR.

Tagaza	7.0.15.40
Tuchorora.	12.30 16.0
Tambutum	15.30.15.40

MEROE.

Meroë is an Flãd of Nilus, ſometime called Saba, & now Elſaba, where S. Matthew did preache the Goſpel. From hence came the quene of Saba, to here Salomõs wiſdome. From hence alſo came Cãdaces, the quenes Enuche, which was baptiſed of Philip th' Appoſtle. But at this preſet it is the ſeate of the mightie prince, that we cal Preter John. 61.30.16.25

QVIOLA.

Quiola, or Cayla, is à region, in which great plentie of Cinamome growe, the chiefe cities are

Hamaharica.	65.0.9.10		
Maſta. 67.30		South Pole. 4 15	
Beritis.	60.40.21.31		
Quiola. 76.30.		South pole. 7.30	
Sabath.	67.30.12.30		
Mombaza. 79.0.		South Pole. 6.0.	
Melinda.	82.30.2 0		

Ca-

Cauaquin. 80.0.9.50
Babell mendap. There are the ſtreightes of the red ſeas. 74.50.11.0.

OF CITIES OF SONdry Regions, in Southe Æthiopia.

Goia	60.50.	South Pole.	19.50
Garma.	57.0	South Pole.	24.0
Bali		70.0.21.40	
Meli		33.0.16.30	

OF THE NOTABLE Ilandes about Africke.

Porto Sancto. 0.35.31.30
Medera an Flande, firſte inhabited of the Portugales, it aboũdeth with Suger, Honie, Wax, & ſundrye Herbes. 358.40.29.50
The Canarian Flãdes beyng x. in numbre. 1.30.23.30
S. Thomas Flãd. 32.30.0.30
Madagaſcar, whiche is alſo called Saint Laurence Ilãd, there the North Pole is not ſene, & the nedle in ſailynge will do no ſeruice. Therefore they ar cõſtreined to vſe Aſtrolabes, & other Inſtrumẽts. 85.30. South Pole. 20.0,

Thus endeth the Deſcription of Africke.

OF

OF ASIA THE THIRDE parte of th'Earth.

HAT Asia is, and wherof it was firste so called, there is no controuersie. For all writers, as wel Historiographers, as also Geographers, make it the iij. part of th'Earth, & to take that name of Asius, sonne to kinge Cotis. And although they call it the iij. part of th'Earth, yet it is not because it conteyneth but the thirde part, but bycause it is so diuided by the seas, for of it selfe it is as much as Europe, & Africke, & conteineth (after Ptolomæus accompt) 48. Prouinces. It is parted into Asia the greater, & Asia the lesser. Notwithstandyng diuers wryters vse this worde Asia the lesser, more largelye than Geographers doth. For they call all that portiõ which is within the south shore of the ponticke seas, & th'east seas Pelagus Ægeum, & the North part of our Ocean, & the West part of the Riuer Euphrates to be Asia the lesser. Asia conteyneth in hir circuit, Bythinia Põtus, the lesser Asia, Lycia, Galatia, Paphlagonia, Pãphilia, Capadocia, the lesser Armenia, & Cilicia. And all these after the maner of th'olde Grecians, is comprehended within this one word Ἀνατολία Anatolia, that is to say th'east plage or coaste. Asia dothe farre excell both Europe and Africke.

Africke. For it is so frutefull, hathe so pleasaunt fildes, such plẽtie of foder & pasture, the heauens geuing moisture to th'Earth in due season. It hath aboũdãce of golde mines. It bringeth forthe plentie of Cinamome, Ginger, Aloës, & diuers aromaticall spices, & Gũmes. There are diuerse straunge beastes bred in Asia, as Vnicornes, Camelles, Liberdes, Mermosites, Mercattes, Grippes. Yet one thing is to them infortunate, that there are terrible & many Earthquakes, in so much that there haue bene x. & xij. Cities at one time subuerted, & ouerthrowen. Th'inhabitauntes are sundrye, & diuers: for some are Anthropophagi, which eate the flesh of men: & drinke their bloud. Ther are also Pygmeans (men but à cubite in height) which riding on Goates, & Rãmes, do kepe warre with Cranes. Ther ar diuers other formes of inhabitauntes resited of Plinius, whiche at this present I willingly ouerpasse. The spirites in this coũtrie, by many illusions seke to bringe trauailers into daungers, sumtime by calling them by theyr names, other times by musicall noise, as it were alluringe thẽ by the swetnes of the sounde, vntil they be brought into danger through wilde beastes. But now these thinges omitted, (whiche would make à great volume of them selues) I will briefely set out the chiefe & principall places of Asia, beginnynge with Pontus, & Bythinia.

PONTVS AND Bythinia.

Chalcedon.	56.20.43.5
Olbia.	57.0.42.40
Nicodemia	56.0.42.40

Claudiopolis, where S. Luke did write his Gospell, & the Actes

Actes of th' Apostles. 59.30.42.45.

Nicæa, where the Nicene counsell was. 58.0.42.15

Cæsaria, smirdiana. 56.40.41.40

Olimpus, an Hill of whiche I spake in the first boke. 57.0.41.40.

THESE FOLOVVINGE are properly called Cities of Asia.

Lampsacus. 55.20.41.25

Illium, somtime called Troie now Ruinous. 55.50.41.0

Dardanũ, Dardanellũ. 55.25.40.5.

Alexandria. 55.25.40.40

Autandrus. 56.30.40.20

Smyrna, the coũtrey where Homer was borne. 58.25.38.25.

Assum. 56.30.40.15

Ephesus, the chiefe citie in Jonia, in whiche S. John wrot his gospel. 57.40.3740

CITIES OF CARIA.

Heraclea. 58.50.43.30

Miletus 58.0.37.0

Nysa 59.0.38.15

Antiochia. 59.30.38.20

Neapolis. 59.25.38.35

Trallis, which is also called Emãthia, at which place certeine suppose Pygmeans inhabit. 58.40.38.5

OF BOTH LYDIAS.

Philadelphia 59.0.38.50

Sardis 58.20.28.15

Sala 60.15.38.20

Sanis 61.0 38.20

Hierapolis 55.20.38.15

Apamia 55.30.42.0

CITIES OF LYCAOnia or Lycia.

Carya 59.50.35.55

Patara 60.30.36.0

Olimpus a Citie 61,30.36.10

Xanthus, Patara 60.30.36.40

Migra 61.0.36.45

CITIES OF GALAtia.

Sinopa stala 63.30.43.0

Pompeiopolis so called because Pompey builded it. 62.0.42.0

Claudiopolis 63.15.42.20

Ancyra 62.40.42.0

Laodicæa 60.15.38.40

OF PAMPHILIA.

Olbia 62.0.36.55

Magydis 62.40.36.55

Seleusia 62.0.38.30

Antiochia 62.30.39.0

CITIES OF DORIS.

Alicarnassus 57.50.36.10

Cadmos an hill 59.40.37.40

Phœnix an hill 58.0.36.30

Apollonia 57.0.39.45

Pargamus, here was the noble Physicion Galenus born, whiche made Phisicke perfaite, and expoundes Hippocrates. 57.35.39.45.

CAPADOCIA.

Tra-

Trapezus Genech. 68.50.43.5
Sebastopolis.s. Greg. 66.0 41.20.
Zama. 65.0 40.45
Archelais. 64.45.39.40

Cæsaria. Maza, here was Basilius magnus Bishoppe. 66.30.39.30

Derba. 64.30.38.15

OF ARMENIA THE lesser.

Satala. 96.50.42.10
Nicopolis. 69.20.41.40
Ispa. 70,30.40.20
Camana. 68.0.38 0
Claudia. 71.0.38,45

CILICIA.

Antiochia 64.40.36.50
Agææ 69.0.36,30
Seleucia 66.10,36,45
Tarsos. S. Paules countrie. 67.40,36.50
Epiphania 69.30.36,0

OF COLCHIS.

Neapolis. Negapotimo. 71.30.45.40.
Geapolis 72,0.45.30
Phasis 72.30.45.0.
Madia 74.15.46.15

OF IBERIA.

Sura 75.0.45.20.
Zalissa 76.0.44.40
Varica. 75.20.46.0

ALBANIA PART of great Tartarye.

Gelda. 83.0.46.30
Albana, 81.40.45.50
Bacchia. 77.0.44.40
Baruca. 79.20.44.40

ARMENIA THE greater.

Lala. 76.10.44.0
Brizaca 74.50.45.30
Babila. 73.15.40.45
Anarium. 76.50.41.30
Belcania. 73.50.39.40

OF SYRIA, THE CITIES

Alexandria 69.30.36.10
Selutia 67.30.32.50
Laodicea, Ramatha 88.30.35.3
Posidium 88.30.35.15
Myriandrus. Alapso 69.30.35.50

PHÆNICIA.

Tripolis 67.30.34.20
Biblus 67.40,33.55
Sidon 67.30.33.30
Tyrus 67.5.33.18

Sor, cõmenly called Sur, à citie after the ruine of Alexãder christened: now destroied of the Turk. Of the ij. cities, Sidõ & Tyrus, Christ our sauior in his gospel speketh.

Ptolomais, Acon. 66.50.33.0

Berytus, but of our trauellers nowe called Barut, it is the Port of Damascus. 67.0. 33.20.

Botrys, Botrus. 67.50.34.5
Dora. 66.30.32.40

Antiochia nye the mõut Taurus, the Countrey of S. Luke Euangelist. 69.0.35.30

Laonia. 70.30.36.20

OF CVRVA, THE CISIES.

Abila Lysanium. 68.45 33.20

Damascus, here did Cain, slẽ his brother Abel. 69.0.33.0

Adra. 68.40.32.10
Hippus, Sephet. 68.0.32.30

Capitolia Suueta 69.45.32.30
Philadelphia 68.0.31.20

LAODICINA.

Paradiſſus 69.45.33.35

IVDEA OR PALE-
ſtina.

Joppa, Joppen or Iaffa a port whiche was builded before the diludge. 65.45.31.55

Aſcalon, hibelis commonly called Eſcolona. 65.0.31.40

The dead ſeas or lake of Sodome. 66.50.31.10

OF GALILÆA.

Iulias or Bethſaida, the coũtry of ſ. Peter, & ſ. Andrew. 67.5.31.15.

OF SAMARIA.

Neapolis, Sichen here did Chriſte conuerte the Samaritane. 66.50.31.50

IVDVA.

Gaza 65.25.31.15
Sebaſta, Samaria 65.40.31.30
Lydda. Rama 66.0.32.0
Ericus, Ierico 66 15.31.25

Nicopolis ſumtime called Emaus, here was Chriſte knowne by breaking of bread 65.45.31.50.

Jeruſalem which is now called Capitolia: & haue diuers other names: here was our ſauiour Chriſt Jeſus crucified, & paid the raunſome for our ſinnes in the beginning of the 34. yeare of his bodelye age. 65.45.31.22.

IDVMÆA.

Berzamma 64.50.31.15
Maps. Maſſa 65.40.30.50

MESOPOTAMIA.

Porſica 72.0.37.30
Soleucia Moſell 79.0.35.40
Edeſſe. Raſe 72.30.37.30
Zama 75.20.36.30

Carre, Charan, here did the holye Patriarch, Abraham dwell. 73.45.36.10.

Babilon, Baldach the chiefe Biſhops ſea in Chadea here (building the tower Babel) ſprãg the cõfuſion of tonges. 79.0.35.0.

Bilba 79.0.35.0
Cęſa 76.40.32.50
Thelma 77.40.32.0
Orchoë 78.30.32.40

ARABIA VVHICHE IS
parted in thre parts: Arabia deſerta, Petrea, & Felix.

Erupa 72.30.30.15
Sora 75.0.30.20
Choca 72.30.32.40
Salma 78.20.29.20
Lyſa 65.50.30.15
Petra 66.45.30.20.
Lydia 69.0.30.40

The red ſeas through which Moſes

Moſes, & th' Iſraelites went 63.30.29.50.

Adra	69.40.31.40

Moũt Sinay, which is alſo called the mounte Oreb, or Choreb. Here receiued Moſes the x. cõmaundementes. 64.0.30.0.

Thebæ	69.40.21.0
Muza	74.30.14.0
Sanina	75.30.11.30
Arabia. Aden	80.0.11.30
Moſcha	88.30.14.0
Cabana	85.0.23.0
Iſtriona	80.0.25.40
Badea. Gydda	70.0.20.15

Mecha. Here is the Sepulcher of Mahomet, which the Turkes go to viſite wyth great deuotion, & yet ſtraungers cõmyng thether ſe no other thing thẽ à golden ſhoe, hanginge in the rouffe of the Temple. 72.15.23.0

Saba, the ſeate of Gaſpar the king, which broughte golde of Arabie, to offer vnto Jeſus, beyng à Childe. 76.0.13.0

ASSIRIA.

Ninus, Niniuie, à great Citie, but nowe deſolate vnto whiche Jonas the Prophete was ſent. 78,0.36.0

Cteſiphon	80.0.35.0
Arbila	80,0.37.15

MEDIA.

Zalaca	86.15.41.0
Mandagara	87.45.39.30
Ecbatana	88.0.37.45
Veneca	93.20.38.15
Gariauna	91.0.37.20
Trauaxa	92.0.37.40
Rapſa	90.10.35.40
Aradripha	93.20.34.45

SVSANA.

Aſia a Citie.	80.10.31 40
Suſa Sambragata	84.0.34.15
Tariana	84.0.32.30
Agra	80.30.33.45

PERSIA.

Axima	87.45.33.50
Perſipolis	90.0.33.10
Diodorus	91.0.33.20
Niſerga	90 15.34.0
Tragonica	87.40.32.40
Baſſara	81.20.29.50

CARMANIA.

Agris	96.30.23.0
Gerniana	100.0.29.0
Thaſpis	98.0.27.40
Armuſa	94.30.23.30

PARTHIA.

Hecatompylon, à City which haue an hundreth gates. 96.20.37.50.

Rhoara	98.30.38.20
Ambrodax	94.30.38.20
Rhagæa	98.20.34.20
Appha.	98.0.35.20

HIRCANIA.

Hercana	98.30.40.0
Adrapſa	98.30.41.40

Saca 94.15.39.30

MARGIANA.

Sena 102.30.42.20
Iasonium 103.30.41.30
Antiochia margiana 106.0 41.40
Nigæa 105.0.41.10

BACTRIANA.

Chomara 106.302.4.40
Menapia 113.0.41.20
Bactra 116.0.41.0

SOGDIANA.

Prepsa 130.0.45.0
Alexandria oxiana 113.0.44.40

Scythia within the Mounte Emaus.

Aspabota 102.0.44.0
Dauaba 104.0.45.0

Scithia without the mount Emaus.

The kingdome of Chatay is vnder the great Cham, king of the Tartarians, the chiefe Cities are

Issedon scithica 150.0.48.30
Soeta 145.0.35.20

SERICA.

Issedon serica 162.0.45.0
Sera 177.15.38.35
Dama 156.0.51.40

In this country breed the Wormes which make silk, we call them in Englishe Silke Wormes, of which at this day the Spaniardes haue greate Plentye.

ARIA AND ARIANA.

The middes of it 106.0.35.30
Namaris 105.40.36.10
Articaudna 109.20.36.10
Alexandria Ariæ 110.0.36.0

DRANGIANA.

Asta 107.30.30.40
Bigis 111.0.29.20
Agriapsa 108.0.34.0

GEGROSIA.

Cumi 110.0.23.50
Parsis 106.30.23.30
Arbis 105.20.20.30

INDIA VVITH IN *the riuer Ganges.*

Bardaxima 213.40.20.40
Monoglossum 114.10.18.20
Mandagara 113.0.14.30
Nitria 115.10.14.20

Colchi now called Cuchina, vnto which the Lucitanians are very frendly 123.0.15.0
Salur 125.0.15.0
Bizantium 113.40.14.40
Tyndis 138.30.16.10

Calicutium, Calechut. The moste famous Citie of Marchaundise in all Indi a, they haue à proper Kinge of their owne: but the Crowne come not by succession vnto theyr children for this cause. For they haue thys vse that whan any manne marieth, he must commit his wife to the priest to be defloured. Vnto this city is brought frō all India al kind of

of ſpice, Cloues, Nutmegges Giger, Cinamome, Rubarbe, Muſk, Sãders, Aloës, Caſsia. Alſo præcious ſtones of diuers kindes, & al maner of ſilkes. Ther ar diuerſe ſortes of inhabitantes in this citie: Chriſtians, Turkes, Mahomites, Caffranans, Idolaters. And this laſt kinde do often (as it ware in token of Frendſhip) lend theyr wiues one to another .112.0.5.0

Simylla 110.0.14.45
Hippocura 120.30.4.0
Caticardama, Corimandel. 136. 20.12.40
Sambolaca 132.15.31.50

PRASIA.

Palibotra 143.0.27.0
Tamalitis 144.30.16.30
Sambalaca 141.0.29.30

COVNTRIES AND CITIES without Ganges in India.

Pentapolis 150.0.18.0
Baracura. Bangella 152.30.16.0
Sabara 159.0.8.30
Begynga 162.20.8.26
Tacola 160.30.4.15
Sabana 160.0.3.0
Colipolis 164.20.0.0
Balonga 167.30.7.0
Synda 167.15.13.40
Thagora 168.0.6.0

☞ *Eldana, hither came S. Thomas to præche the Goſpell.* 152.0.13.0

Trygliphon 154.0.17.0
Gorgatha 167.0.12.30

CHATAY, A REGION.

Chataio 222.0.43.50
VVeaſt Ciamfu 222.0.37.17

☞ *Quinſay, the greateſt Citie in all th'Earthe, and is as muche to ſaye with vs, as the heauenly Citie, in the middes of it, is a Lake, whiche in the circuit, haue* 1200. *Bridges.* 226.0.37.40.

Geiten 259.0.25.15
Eaſt Ciamfu 231.0.32.5
Focho 240.55.7.0
Tingrei 236.0.35.0

MANGI, THIS CONTEINE IN IT. 9. KINGDOMES.

Taygni 224.15.31.0
Sygni 232.0.29.20

Thebet, a Prouince in which the great Cham, lorde of the Eaſt, & ſouth Indians haue his ſeate, & all the kinges of India are vnder him. 204. 10.3.20.

CYAMBA.

Cyamba 208.10.25.30

☞ *Theſe vſe Corall in the ſtead*

steade of money, they haue great plentie of Nutmegges, Aloës, & all kinde of Spices.

SOVTH INDIA.

Th'inhabitantes are all Idolaters, & haue these kingdomes folowyng.

Lamia 202.10.1140
Morfuli 285.0.13.0
Thime 180.0.
South Pole.3.10.

MOABAR.

Nar. The inhabitantes do worship Oxen 276.0. South Pole.20.10
Malaqua, here was S. Thomas slain 260.6. South Pole.15 30

THE KINGDOME of Lac.

Lac, à citie, th'inhabitãtes worship Oxẽ, & ar great Idolaters, yet iust in their affaires, & haters of lyes, & liers.166.30.21.40.

¶OF THE ILANDES adiacent to Asia, and India, and newe Regions of this iij. part lately founde oute.

CYPRVS.

IT is an Ilande in the middle earth Seas, in which Iaphat, one of Noë his sonnes, first inhabitid. 65.30.35.10

SCOTORA.

Scotora, in Arabie the happie now it is called Scoyra. 86.20.12.0.

ORMVSA.

Ormusa is an Ilãd in the narrow Persick seas. 96.20 19.0

TABROBANA.

It is also named Samotra, it is à great Ilande. 151.15. *It is without Latitude, because it is vnder th'Equinoctiall.*

COO.

Coo, an Ilande, in whiche the the prince of Physitians Hippocrat. was born. 57.0.36.25

THE GREATER Iaua.

Iaua. 179.0. the south pole .7.30

BORNO.

*Borno, an Ilande.*178.0.
The South pole.2.30

THE LESSER Iaua.

*Iaua.*188.9. *Vnder th'equinoctiall.*

AMBICON.

Ambicon.166.0. The south pole 7.0.

GELILO.

Gelilo, also Solor, one of the greatest Ilandes of Moluck.
204.0. The south Pole..1.0

Ilandes

ILANDES OF Moluck.

Th'other Flandes are vnder 193.0.9.0.digrees.

IVCATAN

Iucatan. 257.30 19.0

CVBA.

Cuba. 269.30.23.30

It is vnder the Tropicke of Cancer.

IAMAICA.

Iamaica. 270 0.19. 30.

VASANDREA.

Vasandrea. 331.30. 40.0.

Thus endeth the perticuler description of Asia.

A PERTICVLER DESCRIPTION OF *ſuche partes of America, as are by trauaile founde out.*

IGHT order inforſeth that (the iij. partes of the Earth, beynge ſet out accordynge to their notable partes) I ſhall direct my Penne to ſpeake of America, whiche is named the fourth parte, & was to Ptolomæus, & th' Auncient Geographers vnknowē: as alſo at this præſent great part of it is not yet foūd out. It taketh the name of America, of Americus Veſputius, who by the cōmaundement of Ferdinando king of Caſtell, founde it out, in the yeare of Chriſt oure Sauiour. 1497. aboute th' ende of June, as doeth appeare by his owne teſtimonie. The people bothe men, & women are naked, neither ſuffer they any heare to growe on their bodies, no not on their browes, the head except. They are excellent in ſwiming, both men & women, ſo that they without werines can ſwime ij. leaques. Their weapons are bowes, & arrowes, which they præpare, & head with ſtones, & the teath of Fiſhe, for that they want Iron, & all metall (gold except.) They haue warre with th' inhabitauntes of the countrey next them, which haue an other language. But it is not for richeſſe, for inlarging their ſegniory, or election of à king: but for to reuenge the deathes of their prædiceſſors. There is no

law or order obſcrued of wedlocke, for it is lawful to haue ſo many wemen as they affect, & to put them away with out any daunger. They be filthy at meate, & in all ſecrete actes of nature, comparable to brute beaſtes. Their bread is rotes, & theyr meate mans fleſhe, for all theyr enemies, which they ouercome, they with great banketting deuoure. Their houſes are builded like the ſhape of Belles, & couered with leaues & palmes of trees. they vſe no kinde of Marchandiſe, and as for golde, Pearle, ſtone, & that we haue in great priſe: they haue in no eſtimation. For theyr richeſſe is in fethers of diuers colours, & ſtones, which they hange on their eares & lips for an ornatur. They do honour the Sonne, Mone, & Sterres. There is alſo in the weaſt part of America, à region called Peru, moſt riche of all other that hitherto haue bene founde both of meatalles, & præcious Drugges. Their ſhepe be of ſuche fertilitie, that they twiſe yearlye haue Lambe. Th'inhabitantes are ciuill, wiſe, prudẽt, ſkilful of marchandiſe. But yet they know not Chriſt. The middes of America is in digrees. 330. 0. The pole Antarctik 10. 0. The breadth of it is 2100. Engliſh miles, the lẽgth 3000. miles. There are diuers and ſundry Ilandes about America, in our dayes founde oute of whiche hereafter ſhall folow the principall.

PERV VVITH THE ſhore towarde Spaine.

Peru.	290. 5. 0.	ſouth pole.
Archay Cherſoneſus.	303. 0. 5. 0	
Caput de Stado.	317. 0. 2. 30	

Sinus aquæ dulcis, here are vij. Flandes founde, in which are great plentie of Pearle, & præcious Stones.

nes. 322.0. *South Pole.* 5.0.

Rio grande 329.0. South pole. 4.30
S. Rochi 341.0. South pole. 8.15

Caput S. Crucis, here Magelanus founde à Giaunt x. fote in length. 345.0.14.0.

Rio. s. Iacobi 356.0.23.30
Rio de. s. Lucia 341.0.27.20

ILANDES ADIOYning to America.

Riqua the lesser 296.0.10.0
Riqua the greater 300.0.9.0
Th'Iland of Giants 308.7.5.0
Th'Ilande of Brasil 305.4.6.10
La ponto 318.30.4.0

Spagnolla, here is found, Guaiacū that healeth the Neapolitane sicknes. And the middes of th'Flande cōteine. 305.0.23.0.

¶ILANDES TOVVARD

Africke, are innumerable of whiche these are founde oute.

Todosanctos 332.30.17.0
Deforana 323.0.18.0
Degadalupo 331.10.15.30
Caput de bonauentur 294.10.4.10
The grene Iland. 347.0.14.0

FINIS.

A PLENTIFVL TABLE CONTEYNING the principall matters of the whole worke, reduced into th' ordor of th' Alphabete, for the spedier findynge of suche thinges, as you require.

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England